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# SEARCH REQUEST FORM

Examiner # (Mandatory): 81945 Requester's Full Name: Alix Echelmeyer

Art Unit 1745 Location (Bldg/Room#): 6A68 Phone ~~(circle 305 306 308)~~ 2-1101

Serial Number: 10/720,280 Results Format Preferred (circle): PAPER DISK E-MAIL

Title of Invention ______

Inventors (please provide full names): ______

Earliest Priority Date: ______

Keywords (include any known synonyms registry numbers, explanation of initialisms):

**Search Topic:**

Please write detailed statement of the search topic, and the concept of the invention. Describe as specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples of relevant citations, authors, etc., if known. You may include a copy of the abstract and the broadcast or most relevant claim(s).

Please see attached.

(Tried to print out closer art toward beginning.)

## STAFF USE ONLY

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|---|---|---|
| Searcher: EJ | **Type of Search** | **Vendors** (include cost where applicable) |
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| Searcher Location: | ____ A.A. Sequence | ____ Questel/Orbit |
| Date Picked Up: | ✓ Structure (#) (3) | ____ Lexis/Nexis |
| Date Completed: 3-22-07 | ✓ Bibliographic (and) | ____ WWW/Internet |
| Clerical Prep Time: 10 | ____ Litigation1 | ____ In-house sequence systems (list) |
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| | ____ Other | ____ Westlaw |
| | | ____ Other (specify) |

PTO-1590 (2-99)

Best Available Copy

What is claimed is:

1. A membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer; and

said electrode catalyst layer has a total sum volume of pores falling within the pore diameter range from 0.01 to 30 μm, of pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst.

2. The membrane-electrode structure according to claim 1, wherein the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm.

3. A polymer electrolyte fuel cell in which in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between

both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

4. The polymer electrolyte fuel cell according to claim 3, wherein the ion conducting polymer contained in the electrode catalyst layer of said cathode electrode has a weight ratio falling within the range from 1.2 to 1.8 in relation to said carbon particles.

5. The polymer electrolyte fuel cell according to claim 3, wherein the electrode catalyst layer of said cathode electrode is bonded by thermal transfer to said polymer electrolyte membrane, and the pore diameter distribution of the pores formed by said pore forming member in said electrode catalyst layer, before thermal transfer, comprises a third peak in the pore diameter range equal to or more than 5 μm, and

wherein the height of said third peak falls within the range from 0.9 to 1.8 $\mu l/cm^2 \cdot mg$ catalyst in terms of the pore volume.

6. An electric appliance wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

7. A transport machine wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 μl/cm$^2$·mg catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

8. A polymer electrolyte fuel cell in which in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01

to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 μl/$cm^2$·mg catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.

9. The polymer electrolyte fuel cell according to claim 8, wherein the ion conducting polymer contained in the electrode catalyst layer of said cathode electrode falls within the weight ratio range from 1.0 to 1.6 in relation to said carbon particles.

10. The polymer electrolyte fuel cell according to claim 8, wherein the electrode catalyst layer of said cathode electrode is bonded by thermal transfer to said polymer electrolyte membrane, and the pore diameter distribution of the pores formed by said pore forming member in said electrode catalyst layer, before thermal transfer, comprises a third peak in the pore diameter range equal to or more than 5 μm, and

wherein the height of said third peak is 0.18 μl/$cm^2$·mg catalyst or more in terms of the pore volume.

11. An electric appliance wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.

12. A transport machine wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.

## ABSTRACT OF THE DISCLOSURE

A membrane-electrode structure capable of exhibiting excellent electric power generation performance even in a high current region and a polymer electrolyte fuel cell using the membrane-electrode structure are provided. Additionally, electric appliances and transport machines each using the above-described polymer electrolyte fuel cell are provided. The membrane-electrode structure comprises an anode electrode 2a, a cathode electrode 2b and a polymer electrolyte membrane 3 made of a sulfonated polyarylene based polymer and held between both electrodes 2a, 2b. The cathode electrode 2b comprises an electrode catalyst layer 4b containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer falling within the weight ratio range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with the polymer electrolyte membrane 3 through the electrode catalyst layer 4b. The electrode catalyst layer 4b has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by the pore forming member, equal to or more than 6.0 μl/cm$^2$·mg catalyst. The pores formed by said pore forming member have a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm.

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Bib Data Sheet

**CONFIRMATION NO. 4752**

| SERIAL NUMBER | FILING OR 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 10/720,280 | 11/25/2003 RULE | 429 | 1745 | 101175-00041 |

**APPLICANTS**

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Ichiro Tanaka, Wako-shi, JAPAN;
Masaki Tani, Wako-shi, JAPAN;
Junji Matsuo, Wako-shi, JAPAN;

** **CONTINUING DATA** *************************

** **FOREIGN APPLICATIONS** ********************

JAPAN 2002-341362 11/25/2002
JAPAN 2003-360615 10/21/2003

**IF REQUIRED, FOREIGN FILING LICENSE GRANTED**
** 03/11/2004

| | | STATE OR COUNTRY | SHEETS DRAWING | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|
| Foreign Priority claimed | ☐ yes ☐ no | JAPAN | 6 | 12 | 7 |
| 35 USC 119 (a-d) conditions met | ☐ yes ☐ no ☐ Met after Allowance | | | | |
| Verified and Acknowledged | Examiner's Signature ____ Initials | | | | |

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Washington, DC20036-5339

**TITLE**

Membrane-electrode structure and polymer electrolyte fuel cell using the same

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218287

**Banks, Kendra**

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**Sent:** Wednesday, March 14, 2007 4:53 PM
**To:** STIC-EIC1700
**Subject:** Database Search Request, Serial Number: 10/720,280

SCIENTIFIC REFERENCE BR
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Requester:
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    GROUP ART UNIT 1745
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    (571)272-1101
Mailbox Number:

Case serial number:
    10/720,280
Class / Subclass(es):

Earliest Priority Filing Date:

Format preferred for results:

Search Topic Information:
    cathode electrode with 1. catalyst loaded carbon particles, 2. pore forming member (carbon fiber), 3. ion conducting polymer (sulfonated polyarylene)

I am having the most trouble finding "sulfonated polyarylene"
Special Instructions and Other Comments:
    Thanks for your help!

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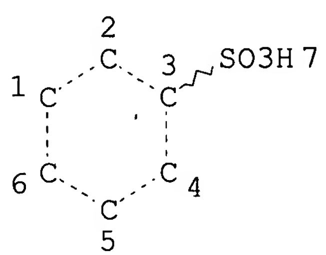


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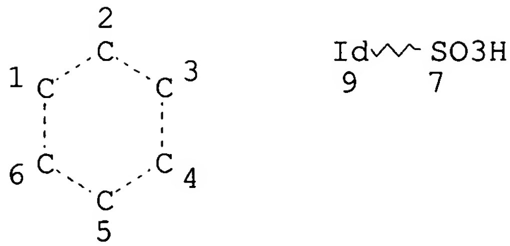

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=> D L88 1-14 CBIB ABS HITSTR HITIND

L88 ANSWER 1 OF 14 HCA COPYRIGHT 2007 ACS on STN
141:40719 Method for producing **membrane-electrode** structure for polymer electrolyte fuel cell. Tani, Masaki; Shinkai, Hiroshi; Kohyama, Katsuhiko; Tanaka, Ichiro; Hama, Yuichiro; Yano, Junichi (Honda Motor Co., Ltd., Japan). U.S. Pat. Appl. Publ. US 2004115499 A1 20040617, 23 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-721505 20031126. PRIORITY: JP 2002-347580 20021129; JP 2002-366037 20021218; JP 2002-379820 20021227; JP 2003-371048 20031030; JP 2003-371049 20031030; JP 2003-371836 20031031.

AB The present invention provides a method for producing a

**membrane-electrode** structure having an excellent adhesiveness between an **electrode** catalyst layer and a diffusion **electrode**, and a polymer electrolyte fuel cell using a **membrane-electrode** structure obtained by the prodn. method. Moreover, it also provides an elec. app. and a transport machine that use the above polymer electrolyte fuel cell. A catalyst past comprising a catalyst supported by an electron conducting material and an ion conducting material is applied on a sheet substrate, and it is then dried, so as to form **electrode** catalyst layers. The **electrode** catalyst layers are thermally transferred onto each side of a polymer electrolyte **membrane**, so as to form a laminated body. A first slurry comprising a water-repellent material and an electron conducting material is applied on a carbon substrate layer, and it is dried to form a water-repellent layer, and then, a second slurry comprising an electron conducting material and an ion conducting material is applied on the water-repellent layer, and it is dried to form a hydrophilic layer, so that a diffusion **electrode** is formed. The previously formed diffusion **electrode** is laminated on the **electrode** catalyst layer through the hydrophilic layer, and they are then pressed under heating, so as to integrate the laminated body and the diffusion **electrode.**

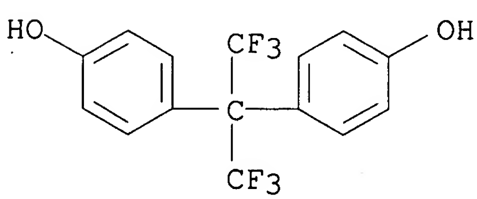
IT **122325-09-1DP**, reaction products with derivatized benzophenones, **sulfonated 463954-50-9DP**, reaction product with bisphenol AF and derivatized benzophenone oligomer, **sulfonated**
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

RN 122325-09-1 HCA

CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (CA INDEX NAME)

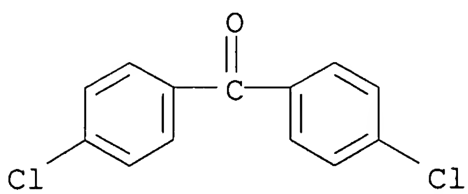
CM 1

CRN 1478-61-1
CMF C15 H10 F6 O2

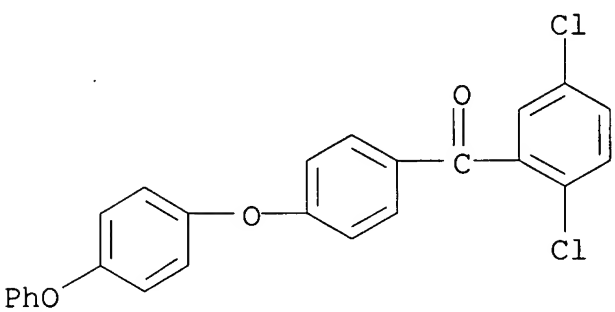



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O



RN 463954-50-9 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]- (9CI)
(CA INDEX NAME)



IT **7440-44-0**, Carbon, uses
(substrate; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

IC ICM H01M008-10
ICS H01M004-88; H01M004-96; B05D005-12
INCL 429030000; 427115000; 502101000; 429044000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST **membrane electrode** structure fabrication polymer electrolyte fuel cell
IT Catalysts
(electrocatalysts; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; method for producing **membrane-electrode** structure for polymer

electrolyte fuel cell)

IT Electric apparatus
Fuel cell **electrodes**
Fuel cell electrolytes
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Fluoropolymers, uses
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Polyketones
(**polyarylene**-polyether-, **sulfonated**; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Polysulfones, uses
(polyarylene-polyether-; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Polyethers, uses
(**polyarylene**-polyketone-, **sulfonated**; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Polyethers, uses
(polyarylene-polysulfone-; method for producing **membrane -electrode** structure for polymer electrolyte fuel cell)

IT Polyphenyls
(polyketone-, fluorine-contg.; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT **Polyphenyls**
(polyketone-, **sulfonated**; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Fluoropolymers, uses
(polyketone-polyphenyl-; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Fuel cells
(polymer electrolyte; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Polyketones
(polyphenyl-, fluorine-contg.; method for producing **membrane-electrode** structure for polymer

electrolyte fuel cell)

IT Polyketones
(**polyphenyl-**, **sulfonated**; method for producing **membrane-electrode** structure, for polymer electrolyte fuel cell)

IT **Carbon fibers**, uses
(**pore** formers; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Carbon black, uses
(support; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT Machinery
(transport; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT 7440-06-4, Platinum, uses 37258-14-3
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT **122325-09-1DP**, reaction products with derivatized benzophenones, **sulfonated** **463954-50-9DP**, reaction product with bisphenol AF and derivatized benzophenone oligomer, **sulfonated** 701909-66-2DP, reaction product with bisphenol AF and derivatized benzophenone oligomer, sulfonated
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT 9002-84-0, Ptfe
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT 122325-09-1P
(method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

IT **7440-44-0**, Carbon, uses
(substrate; method for producing **membrane-electrode** structure for polymer electrolyte fuel cell)

L88 ANSWER 2 OF 14 HCA COPYRIGHT 2007 ACS on STN

141:40691 **Membrane-electrode** structure for polymer electrolyte fuel cell. Fukuda, Kaoru; Tanaka, Ichiro; Tani, Masaki; Matsuo, Junji (Honda Motor Co., Ltd., Japan). Eur. Pat. Appl. EP 1429403 A2 20040616, 26 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2003-26936 20031125. PRIORITY: JP 2002-341362 20021125; JP 2003-360615 20031021.

AB A **membrane-electrode** structure capable of exhibiting excellent elec. power generation performance even in a high current region and a polymer electrolyte fuel cell using the **membrane-electrode** structure are provided. Addnl., elec. appliances and transport machines each using the

above-described polymer electrolyte fuel cell are provided. The **membrane-electrode** structure comprises an **anode**, a **cathode** and a polymer electrolyte **membrane** made of a **sulfonated polyarylene** based polymer and held between both **electrodes**. The **cathode** comprises an **electrode** catalyst layer contg. a catalyst particle having the catalyst loaded on the **carbon particles**, a **pore** forming member and an ion conducting polymer falling within the wt. ratio range from 1.0 to 1.8 in relation to the **carbon particles**, and is in contact with the polymer electrolyte **membrane** through the **electrode** catalyst layer. The **electrode** catalyst layer has a total sum vol. of the **pores** falling within the **pore** diam. range from 0.01 to 30 µm, of the **pores** formed by the **pore** forming member, equal to or more than 6.0 µL/cm2-mg catalyst. The **pores** formed by the **pore** forming member have a first peak falling within the **pore** diam. range from 0.01 to 0.1 µm and a second peak falling within the **pore** diam. range from 0.1 to 1.0 µm.

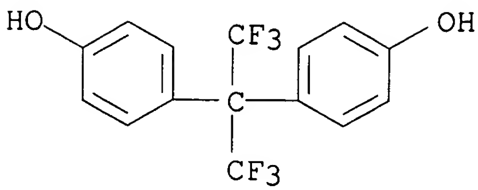
IT **7440-44-0**, Carbon, uses
(**membrane-electrode** structure for polymer electrolyte fuel cell)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

IT **582300-03-6**, **Nafion** SE20192
(**membrane-electrode** structure for polymer electrolyte fuel cell)
RN 582300-03-6 HCA
CN Nafion SE 20192 (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **122325-09-1DP**, reaction products with phenoxy derivatized benzophenone, **sulfonated** **463954-50-9DP**, reaction products bisphenol AF benzophenone oligomer, **sulfonated**
(**membrane-electrode** structure for polymer electrolyte fuel cell)
RN 122325-09-1 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (CA INDEX NAME)

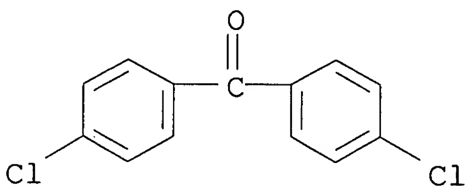
CM 1

CRN 1478-61-1
CMF C15 H10 F6 O2

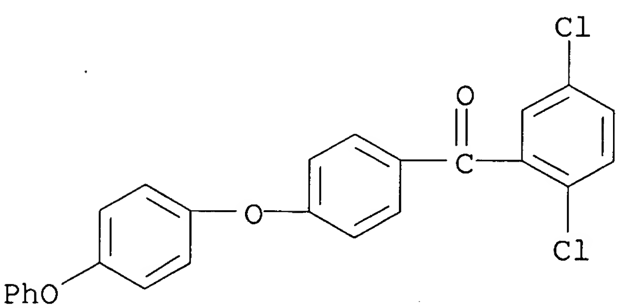



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O




RN 463954-50-9 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]- (9CI)
(CA INDEX NAME)




IC ICM H01M004-86
ICS H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST polymer electrolyte fuel cell **membrane electrode**
structure
IT Catalysts
(electrocatalysts; **membrane-electrode**
structure for polymer electrolyte fuel cell)
IT Polyoxyalkylenes, uses

(fluorine- and sulfo-contg., ionomers; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Electric apparatus
Fuel cell **electrodes**
Fuel cell electrolytes
(**membrane-electrode** structure for polymer electrolyte fuel cell)
IT Carbon black, uses
(**membrane-electrode** structure for polymer electrolyte fuel cell)
IT Polyketones
(**polyarylene**-polyether-, **sulfonated**; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Polysulfones, uses
(polyarylene-polyether-; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Polyethers, uses
(**polyarylene**-polyketone-, **sulfonated**; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Polyethers, uses
(polyarylene-polysulfone-; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Fuel cells
(polymer electrolyte; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT Machinery
(transport; **membrane-electrode** structure for polymer electrolyte fuel cell)
IT 12613-88-6
(**membrane-electrode** structure for polymer electrolyte fuel cell)
IT **7440-44-0**, Carbon, uses
(**membrane-electrode** structure for polymer electrolyte fuel cell)
IT **582300-03-6, Nafion** SE20192
(**membrane-electrode** structure for polymer electrolyte fuel cell)
IT **122325-09-1DP**, reaction products with phenoxy derivatized benzophenone, **sulfonated 463954-50-9DP**, reaction products bisphenol AF benzophenone oligomer, **sulfonated**

(**membrane-electrode** structure for polymer
electrolyte fuel cell)

IT 122325-09-1P
(**membrane-electrode** structure for polymer
electrolyte fuel cell)

L88 ANSWER 3 OF 14 HCA COPYRIGHT 2007 ACS on STN 102(e) barely...

140:409652 Method of fabrication of **electrode** structure for polymer electrolyte fuel cell. Hama, Yuichiro; Iguchi, Masaru; Yano, Junichi; Kanaoka, Nagayuki; Mitsuta, Naoki (Honda Motor Co., Ltd, Japan). U.S. Pat. Appl. Publ. US 2004096731 A1 20040520, 17 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-713146 20031117. PRIORITY: JP 2002-333566 20021118; JP 2002-334302 20021118; JP 2003-371834 20031031; JP 2003-371835 20031031.

AB There is provided an **electrode** structure for a polymer electrolyte fuel cell having excellent power generation performance and excellent durability and a method for manufg. the same. Also provided is a polymer electrolyte fuel cell including the **electrode** structure and an elec. app. and a transport app. using the polymer electrolyte fuel cell. The **electrode** structure includes a polymer electrolyte **membrane** sandwiched between a pair of **electrode** catalyst layers contg. **carbon particles** supporting catalyst particles. The polymer electrolyte **membrane** is made of a **sulfonated polyarylene**-based polymer. The **sulfonated polyarylene**-based polymer has an ion exchange capacity in the range of 1.7 to 2.3 meq/g, and the polymer contains a component insol. in N-methylpyrrolidone in an amt. of 70% or less relative to the total amt. of the polymer, after the polymer is subjected to heat treatment for exposing it under a const. temp. atm. of 120° for 200 h. A catalyst paste contg. catalyst particles and a polymer electrolyte is coated on a sheet-like support and dried to form an **electrode** catalyst layer contg. a solvent in an amt. in the range of 0.5% or less by wt. of the total **membrane**. The **electrode** catalyst layers are thermally transferred and joined on both sides of the polymer electrolyte **membrane**.

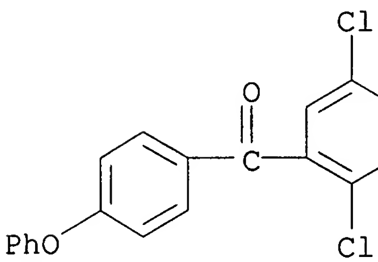
IT **690268-39-4DP, sulfonated**
(method of fabrication of **electrode** structure for
polymer electrolyte fuel cell)

RN 690268-39-4 HCA

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol], block (9CI) (CA INDEX NAME)

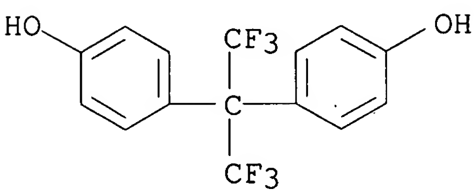
CM 1

CRN 151173-25-0
CMF C19 H12 Cl2 O2



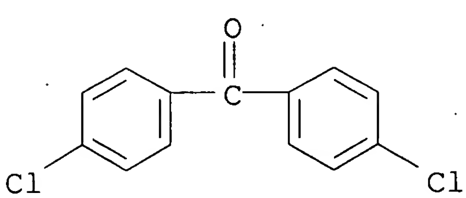
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IC ICM H01M004-96
ICS H01M008-10; H01M004-88; B05D005-12
INCL 429044000; 429033000; 427115000; 502101000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST **electrode** structure polymer electrolyte fuel cell
IT Catalysts

(electrocatalysts; method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT Fuel cell **electrodes**
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT Carbon black, uses
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT Fluoropolymers, uses
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT Polyesters, uses
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT Fuel cells
(solid electrolyte; method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT 7440-06-4, Platinum, uses
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT **690268-39-4DP, sulfonated** 690268-39-4P
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT 9002-84-0, Ptfe
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT 122325-09-1P
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

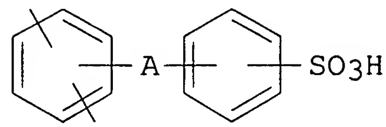
IT 25038-59-9, Polyethylene terephthalate, uses
(method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

IT 7440-44-0, Carbon, uses
(support; method of fabrication of **electrode** structure for polymer electrolyte fuel cell)

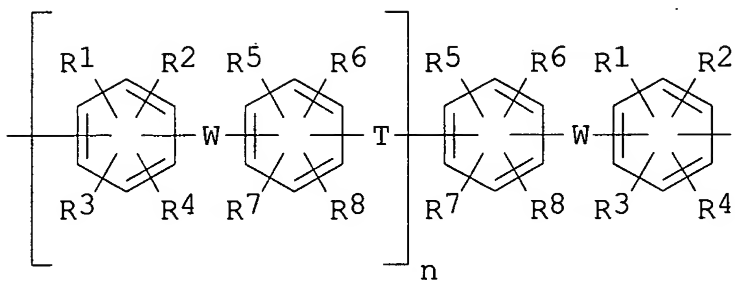
L88 ANSWER 4 OF 14 HCA COPYRIGHT 2007 ACS on STN

140:409627 **Electrode** structure for polymer electrolyte fuel cells. Sohma, Hiroshi; Iguchi, Masaru; Kanaoka, Nagayuyki; Kaji, Hayato; Morikawa, Hiroshi; Mitsuta, Naoki (Honda Motor Co., Ltd., Japan). Eur. Pat. Appl. EP 1420473 A1 20040519, 26 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2003-26194 20031117. PRIORITY: JP 2002-333143 20021118; JP 2003-371047 20031030.

GI



I



II

AB The present invention provides an **electrode** structure for polymer electrolyte fuel cells, inexpensive, and exhibiting excellent power prodn. capacity and durability even under high temp./low humidity conditions, and also provides a polymer electrolyte fuel cell which incorporates the same **electrode** structure. The present invention also provides an elec. device and transportation device, each incorporating the same polymer electrolyte fuel cell. The **electrode** structure comprises a pair of **electrode** catalyst layers, each contg. a catalyst supported by **carbon particles**, and polymer electrolyte **membrane** placed between these **electrode** catalyst layers. The polymer electrolyte **membrane** is of a **sulfonated polyarylene** composed of 0.5 to 100% by mol of the first repeating unit represented by (I) and 0 to 99.5% by mol of the second repeating unit represented by (II): (wherein, A is a divalent org. group; and a benzene ring includes its deriv.; -W- is a divalent electron attracting group; - T- is a divalent org. group; and R1 to R8 are a hydrogen atom or fluorine atom, an alkyl group, fluorine-substituted alkyl group, allyl group, aryl group or cyano group, and may be the same or different).

IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST **electrode** structure polymer electrolyte fuel cell

IT Catalysts
(electrocatalysts; **electrode** structure for polymer electrolyte fuel cells)

IT Fuel cell **electrodes**
(**electrode** structure for polymer electrolyte fuel cells)
IT Noble metals
(**electrode** structure for polymer electrolyte fuel cells)
IT Fluoropolymers, uses
(**electrode** structure for polymer electrolyte fuel cells)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; **electrode** structure for polymer electrolyte fuel cells)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; **electrode** structure for polymer electrolyte fuel cells)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; **electrode** structure for polymer electrolyte fuel cells)
IT Fuel cells
(solid electrolyte; **electrode** structure for polymer electrolyte fuel cells)
IT 7440-06-4, Platinum, uses
(**electrode** structure for polymer electrolyte fuel cells)
IT 690247-89-3D, ester hydrolysis products
(**electrode** structure for polymer electrolyte fuel cells)
IT 9002-84-0, Ptfe
(**electrode** structure for polymer electrolyte fuel cells)
IT 122325-09-1P 663920-23-8P, Benzenesulfonic acid, 4-[4-(2,5-dichlorobenzoyl)phenoxy]-, sodium salt 663920-24-9P, 4-[4-(2,5-Dichlorobenzoyl)phenoxy]benzenesulfonyl chloride 690247-88-2P 690247-89-3P
(**electrode** structure for polymer electrolyte fuel cells)
IT 7440-44-0, Carbon, uses
(support; **electrode** structure for polymer electrolyte fuel cells)

L88 ANSWER 5 OF 14 HCA COPYRIGHT 2007 ACS on STN
140:306711 Catalyst for fuel cell, its manufacture, and the fuel cell. Takei, Fumio (Fujitsu Limited, Japan). PCT Int. Appl. WO 2004027904 A1 20040401, 34 pp. DESIGNATED STATES: W: CA, CN, DE, US. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2003-JP8802 20030710. PRIORITY: JP 2002-273176 20020919.
AB The catalyst has a layer of Pt, Ru, or Pt alloy coated on a conductive support. The catalyst may also have Pt, Ru, or Pt alloy

particles dispersed on the coated catalyst layer, and the support is preferably conductive **C particles** having BET value 100-2000 m2/g. The catalyst is manufd. by prepg. a gel or viscous mixt. contg. a soln. of a Pt group element compd. and a conductive support, reducing the compd., and firing to form the Pt group catalyst layer on the support. The fuel cell has a solid electrolyte **membrane** held between a **cathode** and an **anode**, the **cathode** and the **anode** contain a collector and a catalyst layer, and at least 1 of the catalyst layer contains the above catalyst.

IT **9003-53-6D**, **sulfonated**, sodium salt
    (manuf. of fuel cell catalyst contg. platinum group metal on conductive support by redn. in gel or viscous solns.)
RN 9003-53-6 HCA
CN Benzene, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 100-42-5
CMF C8 H8

$H_2C{=}CH{-}Ph$

IC ICM H01M004-96
    ICS H01M004-88; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell **electrode** platinum group catalyst conductive support manuf; gel redn fuel cell catalyst manuf
IT Fuel cell **electrodes**
    (manuf. of fuel cell catalyst contg. platinum group metal on conductive support by redn. in gel or viscous solns.)
IT 9000-69-5, Pectin 9002-18-0, Agar 9002-89-5D, Poly(vinyl alcohol), tert-stilbazolium modified 9003-05-8, Polyacrylamide 9003-39-8, Polyvinylpyrrolidone **9003-53-6D**, **sulfonated**, sodium salt 9004-32-4, Carboxymethyl cellulose sodium salt 25034-58-6 25322-68-3, Poly(ethylene glycol) 69824-22-2 75855-74-2 127194-90-5 676369-69-0 676369-70-3 676369-71-4
    (manuf. of fuel cell catalyst contg. platinum group metal on conductive support by redn. in gel or viscous solns.)

L88 ANSWER 6 OF 14 HCA COPYRIGHT 2007 ACS on STN
139:103772 Polymer-electrolyte composite **membrane**, **membrane/electrode** assembly, and polymer-electrolyte fuel cell using it. Koyama, Toru; Morishima, Makoto; Kobayashi, Toshiyuki; Kamo, Tomokazu; Higashiyama, Kazutoshi (Hitachi Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003203648 A

20030718, 23 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-769 20020107.

AB The claimed composite **membrane** comprises a sulfonated **porous** polymer **membrane.** The **porous** **membrane** may be filled with a polymer electrolyte. The claimed assembly is equipped with a gas **electrode** bonded with the above **membrane.** The claimed fuel cell is equipped with a pair of gas-diffusion **electrodes** placed on both sides of the composite **membrane,** a pair of gas-impermeable separators sandwiching the **electrodes,** and a pair of sealing materials contacting at outer circumference of the **electrodes.** The composite **membrane** provides high ion cond. and mech. strength.

IC ICM H01M008-02
ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST sulfonated **porous membrane** composite polymer electrolyte fuel cell

IT Perfluoro compounds
(alkanesulfonic acids; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Sulfonic acids, uses
(alkanesulfonic, perfluoro; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Polyketones
Polysulfones, uses
(polyether-, sulfonated, supports; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Polyethers, uses
(polyketone-, sulfonated, supports; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Fuel cell electrolytes
(polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Polyethers, uses
(polysulfone-, sulfonated, supports; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Fuel cells
(solid electrolyte; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT Fluoropolymers, uses
(sulfonated, support; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT **Polyphenyls**
Polythiophenylenes
(**sulfonated**, supports; polymer-electrolyte composite **membrane** contg. sulfonated **porous** polymer support for fuel cell)

IT Synthetic polymeric fibers, uses
(tetrafluoroethylene, sulfonated, supports; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

IT 9002-83-9D, Chlorotrifluoroethylene homopolymer, sulfonated 9002-84-0D, Polytetrafluoroethylene, sulfonated 9002-88-4D, Polyethylene, sulfonated 9003-07-0D, Polypropylene, sulfonated
(support; polymer-electrolyte composite **membrane** contg. sulfonated **porous** support and its **electrode** assembly for fuel cell)

L88 ANSWER 7 OF 14 HCA COPYRIGHT 2007 ACS on STN

138:324073 **Electrode** for fuel cell and the fuel cell using the **electrode.** Taniguchi, Takumi; Rikukawa, Masahiro (Toyota Motor Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2003123771 A 20030425, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-322237 20011019.

AB The **electrode** comprises conductive catalyst loaded conductive particles and proton-conductive electrolyte particles. The fuel cell has an electrolyte **membrane** formed by a polymer material, where ≥1 side of the electrolyte is bonded to the **electrode** to form a power generation layer.

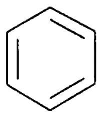
IT **63182-08-1**, Divinyl-benzene-sodium styrenesulfonate copolymer
(**electrodes** contg. catalyst loaded **carbon particles** and proton-conductive electrolyte particles for fuel cells)

RN 63182-08-1 HCA

CN Benzenesulfonic acid, ethenyl-, sodium salt, polymer with diethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 27457-28-9
CMF C8 H8 O3 S . Na
CCI IDS



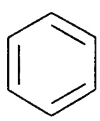
$D1-CH=CH_2$

$D1-SO_3H$

● Na

CM 2

CRN 1321-74-0
CMF C10 H10
CCI IDS



$2\left[ D1-CH=CH_2 \right]$

IC ICM H01M004-86
ICS H01M008-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell **electrode** catalyst loaded conductive particle; **electrode** proton conductive electrolyte particle
IT Fuel cell **electrodes**
Fuel cells
(**electrodes** contg. catalyst loaded **carbon particles** and proton-conductive electrolyte particles for fuel cells)
IT 7440-06-4, Platinum, uses
(**electrodes** contg. catalyst loaded **carbon particles** and proton-conductive electrolyte particles for

fuel cells)

IT 7440-44-0, Carbon, uses 9003-09-2, Polymethyl vinyl ether **63182-08-1**, Divinyl-benzene-sodium styrenesulfonate copolymer
(**electrodes** contg. catalyst loaded **carbon particles** and proton-conductive electrolyte particles for fuel cells)

L88 ANSWER 8 OF 14 HCA COPYRIGHT 2007 ACS on STN

137:127445 Properties of selected sulfonated polymers as proton-conducting electrolytes for polymer electrolyte fuel cells. Bae, J.-M.; Honma, I.; Murata, M.; Yamamoto, T.; Rikukawa, M.; Ogata, N. (Chemical Technology Division, Argonne National Laboratory, Argonne, IL, 60439, USA). Solid State Ionics, 147(1,2), 189-194 (English) **2002**. CODEN: SSIOD3. ISSN: 0167-2738. Publisher: Elsevier Science B.V..

AB Two kinds of polymers were fabricated and tested as candidates of proton-conducting **membranes** for polymer electrolyte fuel cell (PEFC) applications. Poly benzimidazole (PBI) and poly(4-phenoxybenzoyl-1,4-phenylene, Poly-X 2000) (PPBP) were sulfonated and characterized as proton-conducting **membranes**. PBI was sulfonated as PBI-PS (from 1,3-propanesultone) and PBI-BS (from 1,4-butanesultone). PPBP was prepd. at various sulfonation levels. Proton conductivities were measured at 60-160°. Power output characteristics of both polymers were measured by using com. Pt/C **electrodes**.

IT **7440-44-0**, Carbon, uses
(**electrode**; properties of selected sulfonated polymers as proton-conducting electrolytes for polymer electrolyte fuel cells)

RN 7440-44-0 HCA

CN Carbon (CA INDEX NAME)

C

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 28, 39

ST sulfonated polymer proton conducting electrolyte **electrode membrane** fuel cell; polybenzimidazole **polyphenyl sulfonated** fuel cell **electrode**

IT Cation exchange **membranes**
(proton-conducting, solvent-cast; properties of selected sulfonated polymers as proton-conducting electrolytes for polymer electrolyte fuel cells)

IT Polymers, uses
**Polyphenyls**
(**sulfonated**; properties of selected sulfonated polymers

as proton-conducting electrolytes for polymer electrolyte fuel cells)

IT 7440-06-4, Platinum, uses **7440-44-0**, Carbon, uses
(**electrode**; properties of selected sulfonated polymers as proton-conducting electrolytes for polymer electrolyte fuel cells)

IT 7440-21-3, Silicon, uses
(**membrane** support; properties of selected sulfonated polymers as proton-conducting electrolytes for polymer electrolyte fuel cells)

L88 ANSWER 9 OF 14 HCA COPYRIGHT 2007 ACS on STN

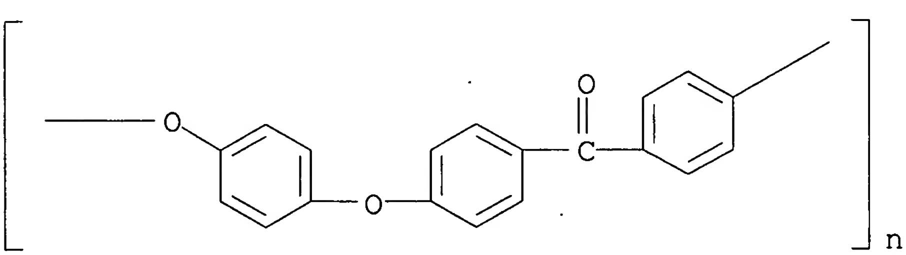
136:281946 Solid polymer electrolyte fuel cell. Fukuda, Kaoru; Ando, Takahiro; Saito, Nobihiro; Nanaumi, Masaaki; Matsuo, Junji (Honda Motor Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002100367 A **20020405**, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-289077 20000922.

AB The fuel cell, for operation without humidification, has a polymer ion exchanger electrolyte **membrane** between a pair of **electrodes**, where the **electrodes** have catalyst particles contg. catalytic metal loaded on carbon black and the ion exchanger component of the electrolyte **membrane**, and the carbon black is hydrophilic, has water adsorption capacity ≥150 cm3/g under 60° satd. water vapor pressure, and is mixed with the ion exchanger component at 0.4-1.25 times it own wt.

IT **31694-16-3D**, Peek, **sulfonated**
(catalyst layers contg. platinum/hydrophilic **carbon** black **particles** and ion exchangers for polymer electrolyte fuel cells)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IC ICM H01M004-86
ICS H01M004-96; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST polymer electrolyte fuel cell **electrode** compn

IT Fuel cell **electrodes**

(catalyst layers contg. platinum loaded on hydrophilic carbon black and ion exchangers for polymer electrolyte fuel cells)

IT Carbon black, uses
(catalyst layers contg. platinum/hydrophilic **carbon** black **particles** and ion exchangers for polymer electrolyte fuel cells)

IT Fuel cells
(**electrode** catalyst layer compns. for polymer electrolyte fuel cells for operation without humidification)

IT 7440-06-4, Platinum, uses
(catalyst layers contg. platinum/hydrophilic **carbon** black **particles** and ion exchangers for polymer electrolyte fuel cells)

IT **31694-16-3D**, Peek, **sulfonated**
(catalyst layers contg. platinum/hydrophilic **carbon** black **particles** and ion exchangers for polymer electrolyte fuel cells)

L88 ANSWER 10 OF 14 HCA COPYRIGHT 2007 ACS on STN

134:298407 Polymer-electrolyte fuel cell with **electrodes** containing alkyl sulfonated polymer. Morita, Junji; Gyoten, Hisaaki; Yasumoto, Eiichi; Kusakabe, Hiroki; Sakai, Osamu; Uchida, Makoto; Sugawara, Yasushi; Yoshida, Akihiko; Kanbara, Teruhisa (Matsushita Electric Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001110428 A **20010420**, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-288085 19991008.

AB The fuel cell is equipped with a proton-conducting polymer-electrolyte **membrane** placed between a pair of **electrodes** comprising a catalyst and a conductive material having both electron- and proton-conducting properties. Thus, a MeOH soln. contg. a Pt catalyst supported on **C** **powder** and polyaniline having (CH2)2SO3H side chain was coated on TGP-H-120 to give **electrodes** and then the **electrodes** were placed on both sides of a **Nafion** 112 **membrane** for contacting at the catalyst sides and then hot pressed to give an unit cell having high c.d. and voltage.

IT **25233-30-1D**, Polyaniline, alkyl **sulfonate** derivs.
(polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl **sulfonated** polymer)

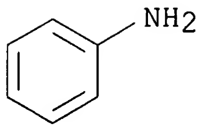
RN 25233-30-1 HCA

CN Benzenamine, homopolymer (CA INDEX NAME)

CM 1

CRN 62-53-3

CMF C6 H7 N



IC ICM H01M004-86
ICS H01B001-06; H01B001-12; H01M008-02; H01M008-10; C08G061-12; C08G073-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST polyaniline alkyl sulfonate **electrode** polymer electrolyte fuel cell; polypyrrole alkyl sulfonate **electrode** polymer electrolyte fuel cell
IT Polyanilines
(alkyl sulfonate derivs.; polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT Fuel cell **electrodes**
Solid state fuel cells
(polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT 7440-44-0, Carbon, uses
(catalyst support; polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT 7440-06-4, Platinum, uses
(catalyst; polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT 291280-30-3, TGP-H-120
(**electrode** contg.; polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT 163294-14-2, **Nafion** 112
(electrolyte **membrane**; polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl sulfonated polymer)
IT 375-73-5D, Perfluorobutanesulfonic acid, polyaniline or polypyrrole derivs. 594-45-6D, Ethanesulfonic acid, polyaniline or polypyrrole derivs. 2386-47-2D, Butanesulfonic acid, polyaniline or polypyrrole derivs. **25233-30-1D**, Polyaniline, alkyl **sulfonate** derivs. 30604-81-0D, Polypyrrole, alkyl sulfonate derivs.
(polymer-electrolyte fuel cell with **electrodes** contg. catalyst and alkyl **sulfonated** polymer)

L88 ANSWER 11 OF 14 HCA COPYRIGHT 2007 ACS on STN
130:224121 Composite solid polymer electrolyte **membranes** and casting or extrusion of a composite **membrane**. Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson (Foster-Miller, Inc., USA). PCT Int. Appl. WO 9910165 A1

**19990304**, 70 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US17898 19980828. PRIORITY: US 1997-57233 19970829.

AB Composite solid polymer electrolyte **membranes** (SPEMs) include a **porous** polymer substrate interpenetrated with an ion-conducting material. The SPEMs are useful in electrochem. applications, including fuel cells, **electrode** separators, and electrodialysis. Thus, polybenzoxazole substrate film (solvent exchanged into NMP) was added to 5% soln. contg. sulfonated (75%) Radel R (I) and after 12 h placed into 20% soln. of sulfonated I, and the composite film isolated, stretched, dried, and solvent extd. to give a film having resistance 0.056 Ω-cm2; vs. 0.203 for a **Nafion** 117 control film.

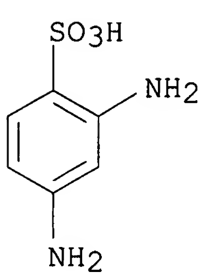
IT **220998-11-8P**, 6FDA-1,3-phenylenediamine-sodium 2,4-diaminobenzenesulfonate copolymer
(imidized, sulfonated; in composite solid polymer electrolyte **membranes**)

RN 220998-11-8 HCA

CN Benzenesulfonic acid, 2,4-diamino-, monosodium salt, polymer with 1,3-benzenediamine and 5,5'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[1,3-isobenzofurandione] (9CI) (CA INDEX NAME)

CM 1

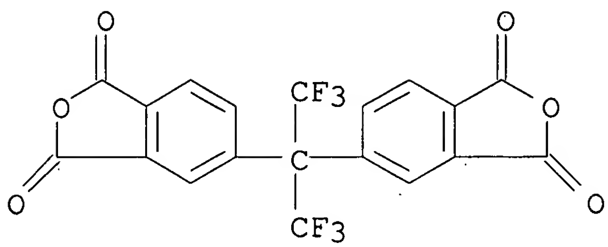
CRN 3177-22-8
CMF C6 H8 N2 O3 S . Na




● Na

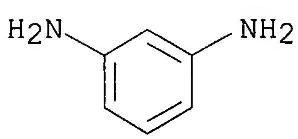
CM 2

CRN 1107-00-2
CMF C19 H6 F6 O6

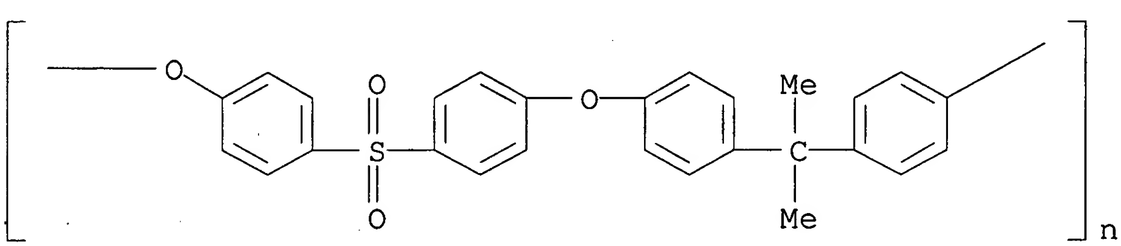


CM 3

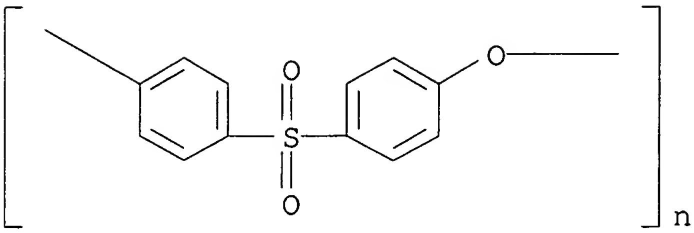
CRN 108-45-2
CMF C6 H8 N2



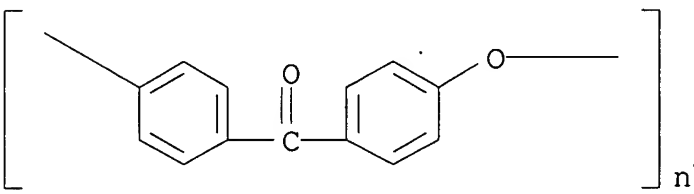
IT **25135-51-7DP**, Udel, **sulfonated**
**25667-42-9DP**, Ultrason E, **sulfonated**
**27380-27-4DP**, Victrex pek, **sulfonated**
(in composite solid polymer electrolyte **membranes**)
RN 25135-51-7 HCA
CN Poly[oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylene(1-methylethylidene)-1,4-phenylene] (CA INDEX NAME)



RN 25667-42-9 HCA
CN Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene) (CA INDEX NAME)



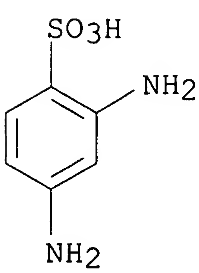

RN 27380-27-4 HCA
CN Poly(oxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)




IT **220998-11-8DP, sulfonated**
(in composite solid polymer electrolyte **membranes**)
RN 220998-11-8 HCA
CN Benzenesulfonic acid, 2,4-diamino-, monosodium salt, polymer with 1,3-benzenediamine and 5,5'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[1,3-isobenzofurandione] (9CI) (CA INDEX NAME)

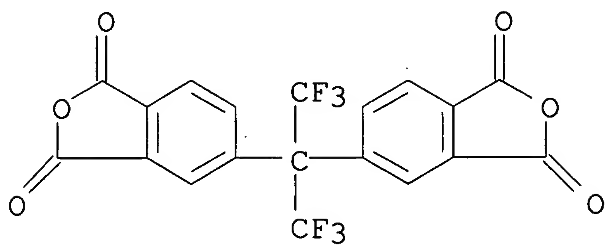
CM 1

CRN 3177-22-8
CMF C6 H8 N2 O3 S . Na



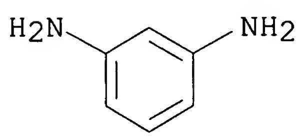

CM 2

CRN 1107-00-2
CMF C19 H6 F6 O6



CM 3

CRN 108-45-2
CMF C6 H8 N2



IC ICM B32B003-26
ICS B01D021-28; B01D024-00; B05D005-00; H01M008-10
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52, 66, 72
ST ion conducting material composite electrolyte **membrane**; **porous** polybenzoxazole film composite electrolyte **membrane**; fuel cell composite electrolyte **membrane** ; electrodialysis composite electrolyte **membrane**; sulfonated polyether sulfone composite electrolyte **membrane**
IT Polyamides, uses
Polyketones
(arom.; in composite solid polymer electrolyte **membranes** )
IT Heat-resistant materials
**Membranes**, nonbiological
(blend of **porous** polymer substrate and ion conducting material; composite solid polymer electrolyte **membranes** with low resistance, good strength and heat resistance)
IT Polymer blends
(blend of **porous** polymer substrate and ion conducting material; composite solid polymer electrolyte **membranes**

with low resistance, good strength and heat resistance)

IT Fuel cells
(composite solid polymer electrolyte **membranes** with low resistance, good strength and heat resistance)

IT Primary batteries
(**electrode** separators; composite solid polymer electrolyte **membranes** with low resistance, good strength and heat resistance)

IT Dialyzers
(electrodialyzers; composite solid polymer electrolyte **membranes** with low resistance, good strength and heat resistance)

IT Liquid crystals, polymeric
(in composite solid polymer electrolyte **membranes**)

IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyimides, uses
Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
(in composite solid polymer electrolyte **membranes**)

IT Polysulfones, uses
Polysulfones, uses
(polyether-, arom.; in composite solid polymer electrolyte **membranes**)

IT Polyimides, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(polyether-; in composite solid polymer electrolyte **membranes**)

IT Polyethers, uses
Polyethers, uses
(polyimide-; in composite solid polymer electrolyte **membranes**)

IT Polyethers, uses
Polyethers, uses
(polyketone-; in composite solid polymer electrolyte **membranes**)

IT Polyquinoxalines
(polyphenylquinoxalines; in composite solid polymer electrolyte **membranes**)

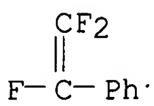
IT Polyethers, uses
Polyethers, uses
(polysulfone-, arom.; in composite solid polymer electrolyte

**membranes**)
IT Polyethers, uses
Polyethers, uses
(polysulfone-; in composite solid polymer electrolyte **membranes**)
IT **220998-11-8P**, 6FDA-1,3-phenylenediamine-sodium 2,4-diaminobenzenesulfonate copolymer
(imidized, sulfonated; in composite solid polymer electrolyte **membranes**)
IT **25135-51-7DP**, Udel, **sulfonated**
**25667-42-9DP**, Ultrason E, **sulfonated**
**27380-27-4DP**, Victrex pek, **sulfonated**
154281-38-6DP, Radel R, sulfonated, sodium salts
(in composite solid polymer electrolyte **membranes**)
IT **220998-11-8DP**, **sulfonated**
(in composite solid polymer electrolyte **membranes**)
IT 24938-64-5, p-Phenylenediamine-terephthalic acid copolymer, sru
25035-37-4, p-Phenylenediamine-terephthalic acid copolymer
25190-62-9, Poly(1,4-phenylene) 27028-97-3, Polyphenylene sulfide sulfone 31694-16-3, PEEK 63496-24-2, **Nafion** ew 1100
(in composite solid polymer electrolyte **membranes**)

L88 ANSWER 12 OF 14 HCA COPYRIGHT 2007 ACS on STN
127:150021 Alpha, beta, beta-trifluorostyrene- and its derivative-based polymer composite **membranes**. Steck, Alfred E.; Stone, Charles (Ballard Power Systems Inc., Can.; Steck, Alfred E.; Stone, Charles). PCT Int. Appl. WO 9725369 A1 **19970717**, 62 pp. DESIGNATED STATES: W: AU, CA, JP, US; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1997-CA3 19970103. PRIORITY: US 1996-583638 19960105.
AB The title **membranes**, particularly useful as **membrane** electrolytes in electrochem. fuel cells, are prepd. by impregnating a **porous** substrate (e.g., of polyethylene, PTFE) with a polymeric compn. comprising α,β,β-trifluorostyrene, and optionally substituted α,β,β-trifluorostyrene (e.g., m-trifluoromethyl-α,β,β-trifluorostyrene), and/or ethylene-based monomeric units.
IT **26838-51-7DP**, Poly(α,β,β-trifluorostyrene), **sulfonated**
(impregnated into **porous** substrates; α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)
RN 26838-51-7 HCA
CN Benzene, (trifluoroethenyl)-, homopolymer (9CI) (CA INDEX NAME)

CM 1

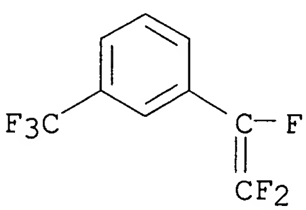
CRN 447-14-3
CMF C8 H5 F3



IT **193218-67-6DP**, m-Trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer, **sulfonated**
(α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)
RN 193218-67-6 HCA
CN Benzene, 1-(trifluoroethenyl)-3-(trifluoromethyl)-, polymer with (trifluoroethenyl)benzene (9CI) (CA INDEX NAME)

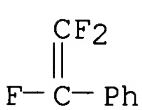
CM 1

CRN 82907-02-6
CMF C9 H4 F6



CM 2

CRN 447-14-3
CMF C8 H5 F3



IC ICM C08J005-22
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76
ST trifluorostyrene deriv polymer composite **membrane**; polyethylene **porous** trifluorostyrene polymer composite **membrane**; PTFE **porous** trifluorostyrene polymer composite **membrane**; electrochem fuel cell trifluorostyrene

polymer **membrane**

IT **Carbon fibers**, uses
(paper **electrodes** for fuel cells; α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

IT Fluoropolymers, uses
(**porous** substrates; α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

IT Fuel cells
**Membranes**, nonbiological
(α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

IT **26838-51-7DP**, Poly(α,β,β-trifluorostyrene), **sulfonated** 188050-58-0P, p-Sulfonylfluoride-α,β,β-trifluorostyrene-m-trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer 193218-67-6P, m-Trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer
(impregnated into **porous** substrates; α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

IT 9002-84-0, PTFE 9002-88-4, Polyethylene
(**porous** substrates; α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

IT **193218-67-6DP**, m-Trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer, **sulfonated**
(α,β,β-trifluorostyrene- and its deriv.-based polymer composite **membranes**)

L88 ANSWER 13 OF 14 HCA COPYRIGHT 2007 ACS on STN

127:68582 Processed sulfonic acid polymer for proton-conducting electrolytic **membranes** for fuel cells. Yen, Shaio-ping S.; Narayanan, Sekharipuram R.; Halpert, Gerald; Graham, Eva; Yavrouian, Andre (California Institute of Technology, USA; Yen, Shaio-Ping S.; Narayanan, Sekharipuram R.; Halpert, Gerald; Graham, Eva; Yavrouian, Andre). PCT Int. Appl. WO 9719480 A1 **19970529**, 45 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1996-US18823 19961122. PRIORITY: US

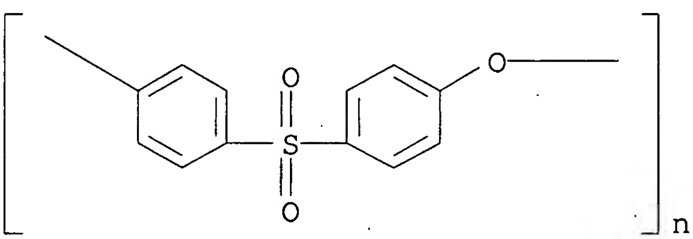
1995-561899 19951122.

AB The processed polymer has asym. properties. The preferred fuel-cell assembly includes an **anode** which is a **porous** C **electrode** including **C**/catalyst **particles** coated with the processed sulfonic acid polymer. The **anode** current collector includes **carbon** paper **fiber** impregnated with the processed polymer. Proton-conducting **membrane** adjoins the **cathode**. The proton-conducting **membrane** includes a dense surface of proton-conducting **membrane** facing the **anode**. The surface facing the **cathode** is preferably a very thin layer of crosslinked low proton-conducting surface.

IT **25667-42-9D, sulfonated 31694-16-3D,**
PEEK, **sulfonated**
(processed **sulfonic** acid polymer for proton-conducting electrolytic **membranes** for fuel cells)

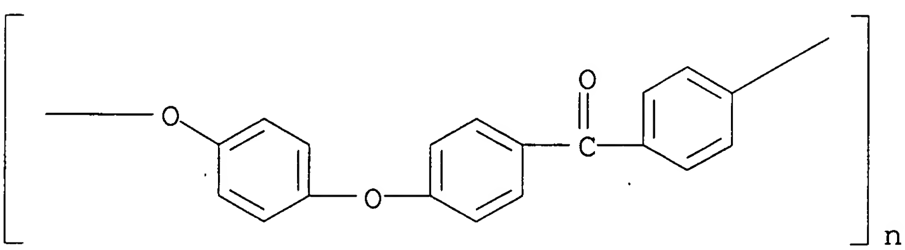
RN 25667-42-9 HCA

CN Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene) (CA INDEX NAME)



RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IC ICM H01M008-10
ICS H01M008-22; C08J005-18

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST sulfonic acid polymer fuel cell **membrane**; polymer sulfonic acid processed fuel cell

IT Polyketones

Polyketones
Polysulfones, uses
Polysulfones, uses
(polyether-, arom., sulfonated; processed sulfonic acid polymer for proton-conducting electrolytic **membranes** for fuel cells)

IT Polyethers, uses
Polyethers, uses
(polyketone-, arom., sulfonated; processed sulfonic acid polymer for proton-conducting electrolytic **membranes** for fuel cells)

IT Polyethers, uses
Polyethers, uses
(polysulfone-, arom., sulfonated; processed sulfonic acid polymer for proton-conducting electrolytic **membranes** for fuel cells)

IT Fuel cell electrolytes
(processed sulfonic acid polymer for proton-conducting electrolytic **membranes** for)

IT **25667-42-9D, sulfonated 31694-16-3D,**
PEEK, **sulfonated**
(processed **sulfonic** acid polymer for proton-conducting electrolytic **membranes** for fuel cells)

L88 ANSWER 14 OF 14 HCA COPYRIGHT 2007 ACS on STN
112:59690 Zinc-iodine secondary cell using 6-nylon or poly(ether) based **electrode.** Basic research for industrial use of the secondary cell. Hishinuma, M.; Iwahori, T.; Sugimoto, H.; Sukawa, H.; Tanaka, T.; Yamamoto, T.; Yanagisawa, Y.; Yoda, Y.; Yoshida, S. (Sch. Public Health, Harvard Univ., Boston, MA, 02115, USA). Electrochimica Acta, 35(1), 255-61 (English) **1990.** CODEN: ELCAAV. ISSN: 0013-4686.

AB A button-type battery with a Zn **anode**/ZnI2-NH4Cl-cation exchange **membrane**-ZnI2-NH4Cl electrolyte/I-**porous** Nylon 6-carbon black composite **cathode** with a vol. of 2.7 cm3 and an **electrode** area of 3 cm2 was fabricated and characterized. Most of the internal resistance of the battery was attributed to the **membrane** separator; an increase in NH4Cl concn. caused a decrease in **membrane** resistance. A battery with a 2M ZnI2 and 6M NH4Cl electrolyte soln. and a Selemion CMV **membrane** had an energy d. of 72 W-h/dm3, a current efficiency of ≤100%, and an energy efficiency of 88%; the battery completed >380 cycles. The self discharge of the battery was .apprx.10%/mo; the open-circuit voltage after charging was affected by temp. and the battery had good cycling behavior at 5-50°.

IT **7440-44-0**
(**carbon fibers**, nylon composites,

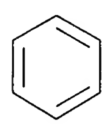
**cathodes**, zinc-iodine battery with, fabrication and performance of)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

IT **9003-70-7D**, Divinylbenzene-styrene copolymer, **sulfonated**
(cation exchanger, battery separator, electrolyte compn. effect on, zinc-iodine battery performance in relation to)
RN 9003-70-7 HCA
CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH=CH2 ]

CM 2

CRN 100-42-5
CMF C8 H8

H2C=CH—Ph

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72
ST zinc iodine battery nylon composite; cation exchanger separator zinc battery; ammonium chloride electrolyte zinc battery; **cathode** nylon carbon black composite
IT Polyethers, uses and miscellaneous
(carbon black composites, **cathodes**, zinc-iodine battery with, fabrication and performance of)

IT Carbon black, uses and miscellaneous
**Carbon fibers**, uses and miscellaneous
(nylon composites, **cathodes**, zinc-iodine battery with, fabrication and performance of)
IT **Cathodes**
(battery, iodine/nylon-carbon and polyether-carbon composites, zinc batteries with, fabrication and performance of)
IT Batteries, secondary
(separators, cation exchange **membranes**, resistivity of, electrolyte concn. effect on, in zinc-iodine battery)
IT 25038-54-4, Nylon 6, uses and miscellaneous
(carbon black composites, **cathodes**, zinc-iodine battery with, fabrication and performance of)
IT 126465-44-9, PS 1730
(carbon black composites, **cathodes**, zinc-iodine battery with, fabriction and performance of)
IT **7440-44-0**
(**carbon fibers**, nylon composites, **cathodes**, zinc-iodine battery with, fabrication and performance of)
IT **9003-70-7D**, Divinylbenzene-styrene copolymer, **sulfonated** 39289-78-6, Neosepta CL 25T 42616-80-8, Selemion CMV 104220-26-0, CM002 107721-14-2, Neosepta CM 1
(cation exchanger, battery separator, electrolyte compn. effect on, zinc-iodine battery performance in relation to)

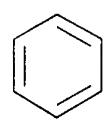
=> D L89 1-8 CBIB ABS HITSTR HITIND

L89 ANSWER 1 OF 8 HCA COPYRIGHT 2007 ACS on STN
140:292153 Electrodialysis-type apparatus containing carbon- and/or metallic sheet-type electric conductor for desalination. Fujii, Yasuhiko; Tanioka, Akihiko; Itoi, Shigeru; Miyamatsu, Norihisa (Japan). Jpn. Kokai Tokkyo Koho JP 2004097897 A 20040402, 15 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-260924 20020906.
AB The claimed app. is equipped with an **anode** chamber and a **cathode** chamber at both ends, anion-exchange **membranes** and cation-exchange **membranes** alternately placed to give alternate desalination chambers and concn. chambers in an electrodialysis app., where a carbon and/or metallic sheet-type conductor is stored at least in the desalination chambers by contacting with (A) cation-exchange **membranes** or cation exchangers contacting with the cation-exchange **membranes** and (B) anion-exchange **membranes** or anion exchangers contacting with the anion-exchange **membranes**. The app., esp. suitable for treating high-purity water, aq. solns., and air, provides high desalination efficiency.
IT **9003-70-7D**, Divinylbenzene-styrene copolymer,

**sulfonated**
(cation-exchange **membrane**; electrodialysis-type app.
contg. carbon- and/or metallic sheet-type elec. conductor for
desalination)
RN 9003-70-7 HCA
CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH=CH2 ]

CM 2

CRN 100-42-5
CMF C8 H8

$H_2C=CH-Ph$

IC ICM C02F001-469
ICS B01D053-22; B01D061-48; B01D061-52; B01D071-26; B01D071-32
CC 61-5 (Water)
IT **Carbon fibers**, uses
(electrodialysis-type app. contg. carbon- and/or metallic
sheet-type elec. conductor for desalination)
IT 42616-95-5, AMV 676245-64-0, AP 1L
(anion-exchange **membrane**; electrodialysis-type app.
contg. carbon- and/or metallic sheet-type elec. conductor for
desalination)
IT **9003-70-7D**, Divinylbenzene-styrene copolymer,
**sulfonated** 42616-80-8, CMV 676245-58-2, CP 1L
(cation-exchange **membrane**; electrodialysis-type app.
contg. carbon- and/or metallic sheet-type elec. conductor for
desalination)

L89 ANSWER 2 OF 8 HCA COPYRIGHT 2007 ACS on STN
138:114047 Electrochemical synthesis of hydrogen peroxide. Gopal, Ramanathan (The Electrosynthesis Company, Inc., USA). U.S. Pat. Appl. Publ. US 2003019758 A1 20030130, 17 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-199719 20020719. PRIORITY: US 2001-307293P 20010722.

AB Improved methods and devices for the synthesis of hydrogen peroxide employing redox catalysts in a gas diffusion **electrode** or **membrane electrode** assembly in a semi-chem./electrochem. system for the prodn. of high purity, stable, usually acidic, aq. solns. of peroxide at high conversion efficiencies without requiring org. solvents.

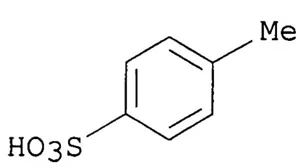
IT **29323-86-2**
(use in prepn. of **electrode** for **membrane** electrolytic cell in electrochem. synthesis of hydrogen peroxide using electrocatalyst)

RN 29323-86-2 HCA

CN Pyridine, 4-ethenyl-, 4-methylbenzenesulfonate, homopolymer (9CI) (CA INDEX NAME)

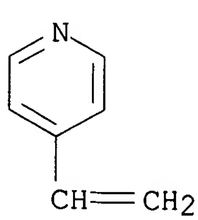
CM 1

CRN 104-15-4
CMF C7 H8 O3 S




CM 2

CRN 100-43-6
CMF C7 H7 N




IC ICM C25B001-30
ICS C25B011-00; C25D017-12; C25B011-03; C25C007-02; C25D017-00;

C25B009-00; C25C007-00
INCL 205466000; 204284000; 205468000; 204283000; 204252000
CC 72-9 (Electrochemistry)
Section cross-reference(s): 47, 49, 67
ST hydrogen peroxide electrochem prodn **membrane** cell electrocatalyst
IT Reduction, electrochemical
(**cathodic**, of oxygen in electrolytically conductive reaction medium, for hydrogen peroxide prodn.)
IT Catalysis
(electrocatalysis; electrochem. synthesis of hydrogen peroxide using electrocatalyst in **membrane** electrolytic cell)
IT **Membrane electrodes**
(electrochem. synthesis of hydrogen peroxide using)
IT Redox reaction catalysts
(electrochem. synthesis of hydrogen peroxide using electrocatalyst in **membrane** electrolytic cell)
IT Carbon black, uses
(**electrode** in electrochem. synthesis of hydrogen peroxide using electrocatalyst in **membrane** electrolytic cell)
IT **Carbon fibers**, uses
(fabrics, hydrophobic; use in prepn. of **electrode** for **membrane** electrolytic cell in electrochem. synthesis of hydrogen peroxide using electrocatalyst)
IT Current density
Current efficiency
(for electrochem. synthesis of hydrogen peroxide using electrocatalyst in **membrane** electrolytic cell)
IT **Electrodes**
(gas-diffusion; electrochem. synthesis of hydrogen peroxide using)
IT Electrolytic cells
(**membrane**; electrochem. prodn. of hydrogen peroxide in)
IT 7440-44-0, Carbon, uses
(activated; **electrode** in electrochem. synthesis of hydrogen peroxide using electrocatalyst in **membrane** electrolytic cell)
IT 7782-44-7, Oxygen, reactions
(**cathodic** redn. of, in electrolytically conductive reaction medium, for hydrogen peroxide prodn.)
IT 7722-84-1, Hydrogen peroxide, processes
(prodn. of, by **cathodic** redn. of oxygen in electrolytically conductive reaction medium)
IT 50-00-0, Formaldehyde, uses 84-60-6, Anthraflavic acid 103-33-3, Azobenzene 123-31-9, Hydroquinone, uses **29323-86-2**
(use in prepn. of **electrode** for **membrane** electrolytic cell in electrochem. synthesis of hydrogen peroxide

using electrocatalyst)

L89 ANSWER 3 OF 8 HCA COPYRIGHT 2007 ACS on STN
134:267638 Characteristics of electrospun **fibers** containing **carbon** nanotubes. Schreuder-Gibson, Heidi; Senecal, Kris; Sennett, Michael; Samuelson, Lynne; Huang, Zhongping; Wen, JianGuo; Li, Wenzhi; Ti, Yi; Wang, Dezhi; Yang, Shaoxian; Ren, Zhifeng; Sung, Changmo (US Army Soldier Biological and Chemical Command Natick Soldier Center, Natick, MA, 01760-5020, USA). Proceedings - Electrochemical Society, 2000-12(Fullerenes 2000--Volume 10: Chemistry and Physics of Fullerenes and Carbon Nanomaterials), 210-221 (English) **2000**. CODEN: PESODO. ISSN: 0161-6374. Publisher: Electrochemical Society.

AB For the past three years, the Army has been investigating a nanofiber prodn. technique for numerous military applications: electrospinning. It has been known since the turn of the century that elec. charged liqs. can produce fine fiber. This fiber spinning technique was first patented in 1934. However, as a method of producing submicron fiber, electrospinning has seen little com. application beyond limited filter manufg. Electrospun fibers naturally assemble into **membrane** structures, and this is an entirely new way to manuf. high surface area **membranes** for all types of applications. One interesting new application might be conductive **membrane** coatings for lightwt., flexible photovoltaic film patches as wearable solar power cells. These would require thin, flexible, highly conductive **electrode** materials. In this work, the use of carbon nanotubes to boost the cond. of org. polymers has been investigated. Carbon nanotubes were dispersed in a mixed polymer soln. The electrospun product is a network of org. polymer **fibers** encapsulating **carbon** nanotubes. Processing characteristics of electrospun polymer solns. have been examd. with respect to the orientation and dispersion of the nanotubes within the fibers and the impact of nanotubes upon measured cond. of a fiber mat of conductive polymer.

IT **9080-79-9**, Sodium polystyrenesulfonate
(polyaniline blends, conductive; characteristics of electrospun **fibers** contg. **carbon** nanotubes for enhancement of cond. of polymers)

RN 9080-79-9 HCA

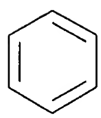
CN Benzenesulfonic acid, ethenyl-, homopolymer, sodium salt (9CI) (CA INDEX NAME)

CM 1

CRN 50851-57-5
CMF (C8 H8 O3 S)x
CCI PMS

CM 2

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

CC 40-7 (Textiles and Fibers)
Section cross-reference(s): 38, 39, 76
ST electrospun **fiber** **carbon** nanotube;
electrospinning **fiber** **carbon** nanotube;
conductive polymer electrospun **fiber** **carbon**
nanotube
IT Nanotubes
(carbon; characteristics of electrospun **fibers** contg.
**carbon** nanotubes for enhancement of cond. of polymers)
IT Polymer morphology
(characteristics of electrospun **fibers** contg.
**carbon** nanotubes for enhancement of cond. of polymers)
IT Polyurethane fibers
(characteristics of electrospun **fibers** contg.
**carbon** nanotubes for enhancement of cond. of polymers)
IT Urethane rubber, properties
(fibers, Pellethane 70A and Estane 80A; characteristics of
electrospun **fibers** contg. **carbon** nanotubes
for enhancement of cond. of polymers)
IT Conducting polymers
(polyaniline-sulfonated polystyrene blends; characteristics of
electrospun **fibers** contg. **carbon** nanotubes
for enhancement of cond. of polymers)
IT Polymer blends
(polyaniline-sulfonated polystyrene, conductive; characteristics
of electrospun **fibers** contg. **carbon** nanotubes
for enhancement of cond. of polymers)
IT Ionomers

(sulfo-contg.; characteristics of electrospun **fibers** contg. **carbon** nanotubes for enhancement of cond. of polymers)

IT Polyanilines
(sulfonated polystyrene blend, conductive; characteristics of electrospun **fibers** contg. **carbon** nanotubes for enhancement of cond. of polymers)

IT **9080-79-9**, Sodium polystyrenesulfonate
(polyaniline blends, conductive; characteristics of electrospun **fibers** contg. **carbon** nanotubes for enhancement of cond. of polymers)

IT 25233-30-1, Aniline homopolymer
(sulfonated polystyrene blend, conductive; characteristics of electrospun **fibers** contg. **carbon** nanotubes for enhancement of cond. of polymers)

L89 ANSWER 4 OF 8 HCA COPYRIGHT 2007 ACS on STN

131:90268 Fuel cell system for low pressure operation. Cisar, Alan J.; Weng, Dacong; Murphy, Oliver J. (Lynntech, Inc., USA). PCT Int. Appl. WO 9934467 A2 **19990708**, 77 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US19221 19980910. PRIORITY: US 1997-926547 19970910.

AB A fuel cell design for use at low pressure has a reduced no. of component parts to reduce fabrication costs, as well as a simpler design that permits the size of the system to be reduced at the same time as performance is being improved. In the present design, an adjacent **anode** and **cathode** pair are fabricated using a common conductive element, with that conductive element serving to conduct the current from one cell to the adjacent one. This produces a small and simple system suitable for operating with gas fuels or alternatively directly with liq. fuels, such as methanol, dimethoxymethane, or trimethoxymethane. The use of these liq. fuels permits the storage of more energy in less vol. while at the same time eliminating the need for handling compressed gases which further simplifies the fuel cell system. The elec. power output of the design of this invention can be further increased by adding a passage for cooling the stack through contact with a coolant.

IT **9003-53-6D**, Polystyrene, **sulfonated**
(moisture control element; fuel cell system for low pressure operation)

RN 9003-53-6 HCA
CN Benzene, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 100-42-5
CMF C8 H8

$H_2C{=}CH{-}Ph$

IC ICM H01M008-24
ICS H01M008-04; H01M004-86; H01M004-96; H01M004-88; C25B009-00; C25B011-03
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72
IT Polycarbonates, uses
(filter **membranes**; fuel cell system for low pressure operation)
IT Electrolytic cells
Fuel cell **anodes**
Fuel cell **cathodes**
Fuel cells
(fuel cell system for low pressure operation)
IT Carbon black, uses
**Carbon fibers**, uses
Fluoropolymers, uses
(fuel cell system for low pressure operation)
IT 162774-80-3, **Nafion** 105 163294-14-2, **Nafion** 112
(fuel cell system for low pressure operation)
IT 9002-89-5, Polyvinyl alcohol 9003-01-4D, Polyacrylic acid, salt
**9003-53-6D**, Polystyrene, **sulfonated**
(moisture control element; fuel cell system for low pressure operation)

L89 ANSWER 5 OF 8 HCA COPYRIGHT 2007 ACS on STN
119:258467 Characterization of sulfonic acids of high-temperature polymers as **membranes** for water electrolysis. Linkous, Clovis A.; Slattery, Darlene (Florida Solar Energy Cent., Cape Canaveral, FL, 32920, USA). Polymeric Materials Science and Engineering, 68, 122-3 (English) **1993**. CODEN: PMSEDG. ISSN: 0743-0515.
AB Sulfonated PEEK (a polyether-polyketone), sulfonated PES (a polyether-polysulfone) and sulfonated poly[2,2'-(m-phenylene)-5,5'-dibenzimidazole] (sulfonated PBI) were prepd. and used as **membranes** in an electrolytic cell with gas-diffusion **electrode** from Pt supported on C cloth. The sulfonated PEEK

**membrane** enabled a rate of hydrogen evolution at a fixed voltage superior to that of the ceramic product. Within the range of reproducibility sulfonated PES performed slightly better than the com. ionomer but sulfonated PBI was slightly worst than the **Nafion** std.

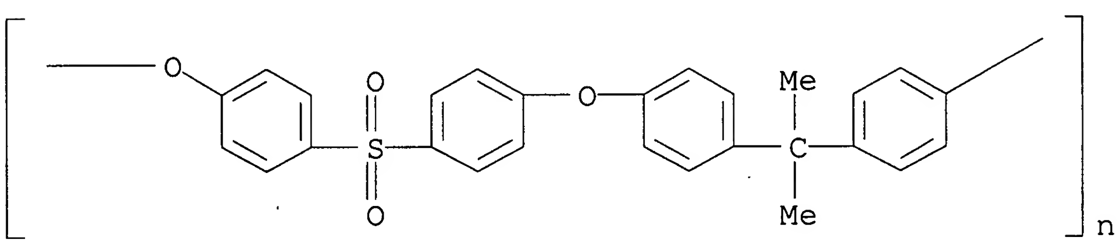
IT **7440-44-0**
(**carbon fibers**, supports, cloth, for platinum **electrode** for water electrolysis in cell with sulfonated polymer **membranes**)

RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

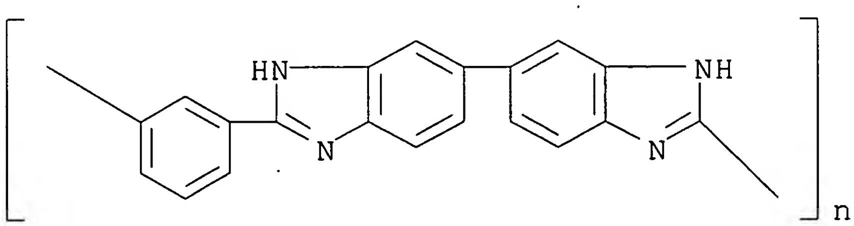
C

IT **25135-51-7D**, UDEL P-1700, **sulfonated**
**25734-65-0D**, Poly[2,2'-(M-phenylene)-5,5'-bibenzimidazole), **sulfonated** **31694-16-3D**, PEEK, **sulfonated**
(**membrane**, for electrolytic cell for water electrolysis)

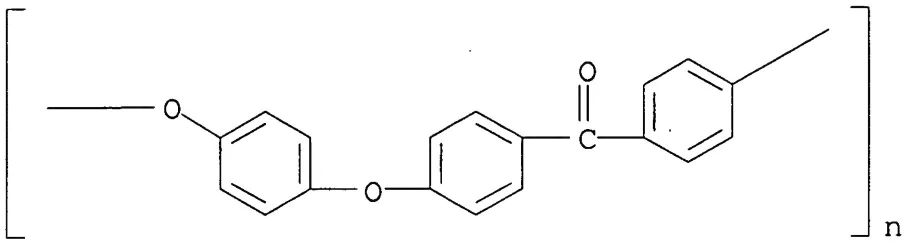
RN 25135-51-7 HCA
CN Poly[oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylene(1-methylethylidene)-1,4-phenylene] (CA INDEX NAME)



RN 25734-65-0 HCA
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)



RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 72-9 (Electrochemistry)
Section cross-reference(s): 38, 49

ST sulfonated polymer **membrane** electrolyzer water electrolysis; polyester polyketone sulfonated **membrane** water electrolysis; polysulfone polyether sulfonated **membrane** water electrolysis; polybenzimidozole sulfonated **membrane** water electrolysis cell

IT Sulfonation
(of polyether-polyketone and polyether-polysulfone and polybenzimidazole for **membranes** for water electrolysis)

IT Polybenzimidazoles
(sulfonated, **membrane**, for electrolytic cell for water electrolysis)

IT **Carbon fibers**, uses
(supports, cloth, for platinum **electrode** for water electrolysis in cell with sulfonated polymer **membranes**)

IT Electrolytic cells
(diaphragm, with sulfonated polymer **membranes**, for water electrolysis)

IT Cation exchangers
(**membranes**, sulfonated polymers, for water electrolysis)

IT Polyketones
Polysulfones, compounds
(polyether-, sulfonated, **membrane**, for electrolytic cell for water electrolysis)

IT Polyethers, compounds
(polyketone-, sulfonated, **membrane**, for electrolytic cell for water electrolysis)

IT Polyethers, compounds
(polysulfone-, sulfonated, **membrane**, for electrolytic cell for water electrolysis)

IT **7440-44-0**
(**carbon fibers**, supports, cloth, for platinum **electrode** for water electrolysis in cell with sulfonated polymer **membranes**)

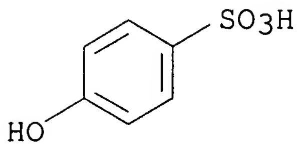
IT 7440-06-4, Platinum, uses
(**electrode**, supported on carbon cloth, for water

electrolysis in cell with sulfonated polymer **membrane**)
IT 7732-18-5, Water, reactions
(electrolysis of, sulfonated polymer **membranes** for electrolytic cells for)
IT **25135-51-7D**, UDEL P-1700, **sulfonated**
**25734-65-0D**, Poly[2,2'-(M-phenylene)-5,5'-bibenzimidazole),
**sulfonated 31694-16-3D**, PEEK, **sulfonated**
(**membrane**, for electrolytic cell for water electrolysis)
IT 66796-30-3, **Nafion**-117
(**membrane**, in electrolytic cell for water electrolysis, comparison of sulfonated polymer **membranes** with)
IT 1333-74-0P, Hydrogen, preparation
(prodn. of, in water electrolysis, sulfonated polymer **membranes** for electrolytic cell for)

L89 ANSWER 6 OF 8 HCA COPYRIGHT 2007 ACS on STN
118:93518 Electrochemical preparation of semipermeable polymer **membranes** on **carbon fiber** microelectrodes for selective amperometric detection of cations. Potje-Kamloth, Karin; Josowicz, Mira (Fak. Elektrotech., Univ. Bundesw. Muenchen, Neubiberg, W-8014, Germany). Berichte der Bunsen-Gesellschaft, 96(8), 1004-17 (English) **1992.** CODEN: BBPCAX. ISSN: 0005-9021.
AB An electrochem. procedure is presented for in situ prepn. and subsequent deposition of semipermeable **membranes** on ultramicroelectrodes. The **membranes** are based on a matrix of poly(oxyphenylene) bearing carboxyl and sulfonic groups, i.e. poly(1,2-oxyphenylene-4-sulfonic acid) or poly(1,2-oxyphenylene-3-carboxylic acid). These **membranes** exhibit a cation exchange behavior whereas the transport of anions is inhibited. The diffusion coeffs. of Ru(NH3)63+ within the semipermeable **membranes** could be estd. by chronoamperometric and steady-state measurements. The values obtained are at 1.0-6.9 + 10-7 cm2/s. The permeability of the cation through the **membranes** is high. Therefore, no distortion of the voltammetric response due to the attached **membrane** is obsd. The transport rate can be modulated by copolymn. of the functionalized phenolic monomer with varying amts. of a crosslinking agent. The ultramicroelectrodes modified with the above **membranes** can be used as amperometric sensors displaying a linear current/concn. relation.
IT **145817-03-4 145817-04-5**
(**carbon fiber** microelectrode modified with semipermeable **membrane** of, for selective amperometric detection of cations)
RN 145817-03-4 HCA
CN Benzenesulfonic acid, 4-hydroxy-, homopolymer (9CI) (CA INDEX NAME)

CM 1

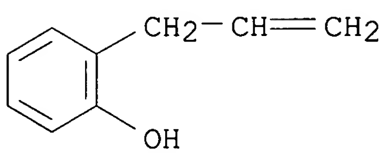
CRN 98-67-9
CMF C6 H6 O4 S




RN 145817-04-5 HCA
CN Benzenesulfonic acid, 4-hydroxy-, polymer with 2-(2-propenyl)phenol (9CI) (CA INDEX NAME)

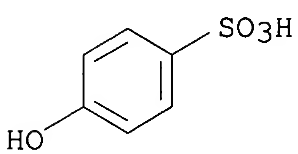
CM 1

CRN 1745-81-9
CMF C9 H10 O




CM 2

CRN 98-67-9
CMF C6 H6 O4 S




IT **7440-44-0**
(**carbon fibers**, microelectrodes, modified with polyoxyphenylene semipermeable **membranes**, for selective amperometric detection of cations)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

CC 80-2 (Organic Analytical Chemistry)
Section cross-reference(s): 38, 72, 79
ST **carbon fiber** microelectrode polymer **membrane** modified; amperometric detn cation **carbon fiber** microelectrode; semipermeable polymer **membrane** modified microelectrode; polyoxyphenylene **membrane** modified **carbon fiber** microelectrode
IT Polyoxyphenylenes
(**carbon fiber** microelectrode modified with semipermeable **membrane** of, for selective amperometric detection of cations)
IT Amperometry
(**carbon fiber** microelectrodes modified with polyoxyphenylene semipermeable **membranes** for, for selective detn. of cations)
IT Cations
(detn. of, **carbon fiber** microelectrodes modified with polyoxyphenylene semipermeable **membranes** for selective amperometric)
IT **Carbon fibers**, uses
(microelectrodes, modified with polyoxyphenylene semipermeable **membranes**, for selective amperometric detection of cations)
IT Permeability and Permeation
(of cations and anions through poly(oxyphenylene) **membranes** on **carbon fiber** microelectrodes)
IT **Electrodes**
(amperometric micro-, **carbon fiber**, modified with polyoxyphenylene semipermeable **membranes**, for selective detn. of cations)
IT Polymerization
(electrochem., of phenolic compds. on **carbon fiber** microelectrodes)
IT 25302-76-5 25496-36-0, Poly(salicylic acid) 27924-98-7 145639-71-0 145788-21-2 145788-22-3 145788-23-4 145788-24-5 145788-25-6 145788-26-7 145788-27-8 **145817-03-4** **145817-04-5**
(**carbon fiber** microelectrode modified with semipermeable **membrane** of, for selective amperometric detection of cations)
IT **7440-44-0**
(**carbon fibers**, microelectrodes, modified with polyoxyphenylene semipermeable **membranes**, for selective amperometric detection of cations)
IT 51-61-6, Dopamine, analysis
(detn. of, in presence of ascorbic acid by amperometry at

**carbon fiber** microelectrodes modified with
polyoxyphenylene semipermeable **membranes**)
IT 50-81-7, Ascorbic acid, analysis
(dopamine detn. in presence of, by amperometry at **carbon fiber** microelectrodes modified with polyoxyphenylene semipermeable **membranes**)
IT 69-72-7, Salicylic acid, analysis 98-67-9, 4-Hydroxybenzenesulfonic acid 99-06-9, 3-Hydroxybenzoic acid, analysis 99-10-5 148-25-4, 4,5-Dihydroxynaphthalene-2,7-disulfonic acid 303-07-1, 2,6-Dihydroxybenzoic acid 1745-81-9, 2-Allylphenol
(polymn. of, electrochem. on **carbon fiber** microelectrodes for selective amperometric detection of cations)

L89 ANSWER 7 OF 8 HCA COPYRIGHT 2007 ACS on STN
117:244760 Amperometric biosensors based on an apparent direct electron transfer between **electrodes** and immobilized peroxidases.
Gorton, Lo; Joensson-Pettersson, Gunilla; Csoregi, Elisabeth; Johansson, Kristina; Dominguez, Elena; Marko-Varga, Gyorgy (Dep. Anal. Chem., Univ. Lund, Lund, S-221 00, Swed.). Analyst (Cambridge, United Kingdom), 117(8), 1235-41 (English) **1992**
. CODEN: ANALAO. ISSN: 0003-2654.
AB An apparent direct electron transfer between various **electrode** materials and peroxidases immobilized on the surface of the **electrode** has been reported in the last few years. An electrocatalytic redn. of hydrogen peroxide starts at about +600 mV vs. a satd. calomel (ref.) **electrode** (SCE) at neutral pH. The efficiency of the electrocatalytic current increases as the applied potential is made more neg. and starts to level off at about -200 mV vs. SCE. Amperometric biosensors for hydrogen peroxide can be constructed with these types of peroxidase modified **electrodes**. By co-immobilizing a hydrogen peroxide-producing oxidase with the peroxidase, amperometric biosensors can be made that respond to the substrate of the oxidase within a potential range essentially free of interfering electrochem. reactions. Examples of glucose, alc. and amino acid sensors are shown.
IT **7440-44-0 7782-42-5**
(**carbon fibers**, **graphite**, hydrogen peroxidase immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

RN 7782-42-5 HCA

CN Graphite (CA INDEX NAME)

C

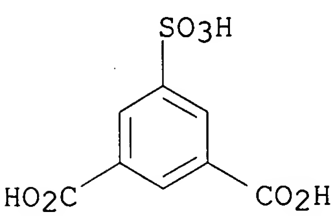
IT **7440-44-0**
(**carbon fibers**, hydrogen peroxidase
immobilized on, in hydrogen peroxide amperometric sensor for
anal.)
RN 7440-44-0 HCA
CN Carbon (CA INDEX NAME)

C

IT **54590-62-4**, AQ 29D
(**membrane**, in hydrogen peroxide amperometric biosensor
based on immobilized peroxidase)
RN 54590-62-4 HCA
CN 1,3-Benzenedicarboxylic acid, 5-sulfo-, monosodium salt, polymer
with 1,3-benzenedicarboxylic acid and 2,2'-oxybis[ethanol] (9CI)
(CA INDEX NAME)

CM 1

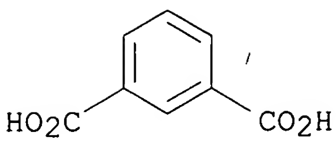
CRN 6362-79-4
CMF C8 H6 O7 S . Na




● Na

CM 2

CRN 121-91-5
CMF C8 H6 O4



CM 3

CRN 111-46-6
CMF C4 H10 O3

$HO-CH_2-CH_2-O-CH_2-CH_2-OH$

CC 80-2 (Organic Analytical Chemistry)
Section cross-reference(s): 9
IT **Carbon fibers**, uses
(hydrogen peroxidase immobilized on, in hydrogen peroxide amperometric sensor for anal.)
IT **Electrodes**
(amperometric, paste, peroxidase and oxidase coimmobilized on, for alcs. and amino acids and glucose detn.)
IT **Carbon fibers**, uses
(**graphite**, hydrogen peroxidase immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)
IT **7440-44-0** **7782-42-5**
(**carbon fibers**, **graphite**, hydrogen peroxidase immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)
IT **7440-44-0**
(**carbon fibers**, hydrogen peroxidase immobilized on, in hydrogen peroxide amperometric sensor for anal.)
IT 111-30-8, Glutaraldehyde 151-51-9, Carbodiimide
(in immobilization of peroxidase and oxidase in carbon paste **electrode** in prepn. of amperometric sensors)
IT **54590-62-4**, AQ 29D
(**membrane**, in hydrogen peroxide amperometric biosensor based on immobilized peroxidase)

L89 ANSWER 8 OF 8 HCA COPYRIGHT 2007 ACS on STN
109:58200 Room-temperature acidic methanol fuel cells. Mochizuki, Masaji; Kono, Tadashi; Yoshikawa, Hirokazu; Kitagawa, Satoshi; Tsukui, Tsutomu; Shimizu, Toshio (Hitachi Maxell, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 63076269 A **19880406** Showa, 7

pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-221213 19860918.

AB The cells have a plurality of in-series connected unit cells, each comprising a **cathode**, an **anode**, and an electrolyte **membrane**, attached to a fuel tank with the **cathodes** exposing to ambient air and the **anodes** in contact with the fuel. The electrolyte **membrane** is a cation-exchanger **membrane** covered on both sides with fuel-insol. styrenesulfonic acid graft copolymer films. Thus, 0.5-mm-thick sulfonated polystyrene-based cation-exchanger **membranes** were covered with styrenesulfonic acid-nonaethylene glycol dimethacrylate graft copolymer films to form electrolyte **membranes** for use in unit cells having Pt black-catalytic nonwoven active **carbon-fiber** cloth **cathodes** and Pt-Ru black-catalytic nonwoven active **carbon-fiber** cloth **anodes**. The use of this electrolyte **membrane** prevented short circuiting of the cells by the electrolyte, and fuel cells of this structure had a high output voltage.

IT **115634-42-9**

(composites of sulfonated-polystyrene cation-exchanger **membrane** covered with, for methanol fuel cells)

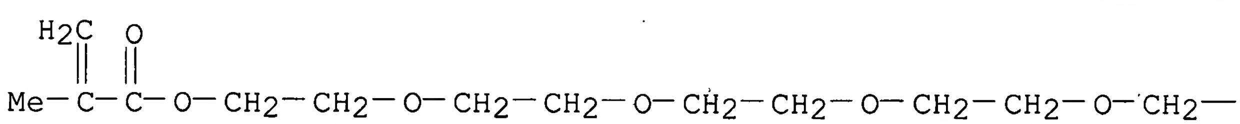
RN 115634-42-9 HCA

CN 2-Propenoic acid, 2-methyl-, 3,6,9,12,15,18,21,24-octaoxahexacosane-1,26-diyl ester, polymer with sodium ethenylbenzenesulfonate, graft (9CI) (CA INDEX NAME)

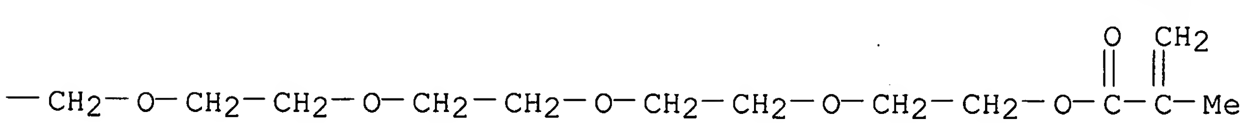
CM 1

CRN 45314-30-5
CMF C26 H46 O12

PAGE 1-A

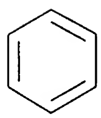



PAGE 1-B



CM 2

CRN 27457-28-9
CMF C8 H8 O3 S . Na
CCI IDS



D1—CH=CH2

D1—SO3H

● Na

IC ICM H01M008-24
ICS H01M008-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST methanol fuel cell electrolyte **membrane**; methacrylate
graft copolymer electrolyte **membrane**; polystyrene
sulfonated composite electrolyte **membrane**
IT Fuel cells
(methanol, electrolyte **membranes** for)
IT Cation exchangers
(sulfonated polystyrene, composite **membranes** of
nonaethylene glycol dimethacrylate-styrenesulfonic acid graft
copolymer-covered, for methanol fuel cells)
IT **115634-42-9**
(composites of sulfonated-polystyrene cation-exchanger
**membrane** covered with, for methanol fuel cells)

=> D L90 1-9 CBIB ABS HITSTR HITIND

L90 ANSWER 1 OF 9 HCA COPYRIGHT 2007 ACS on STN
140:18408 Ionomer-based gas diffusion **electrodes** for polymer
fuel cells. Gogel, Viktor; Frey, Thomas; Joerrisen, Ludwig;
Friedrich, Kaspar Andreas; Kerres, Jochen (Zentrum fuer

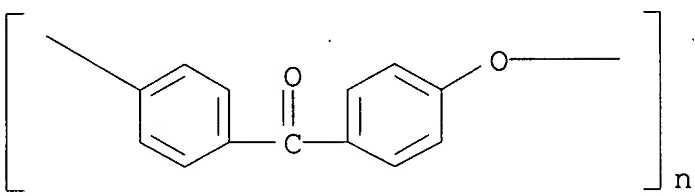
Sonnenenergie- und Wasserstoff-Forschung Baden-Wuerttemberg Gemeinnuetzige Stiftung, Germany; Universitaet Stuttgart). Ger. Offen. DE 10223208 A1 20031211, 10 pp. (German). CODEN: GWXXBX. APPLICATION: DE 2002-10223208 20020524.

AB Gas diffusion-**membrane electrodes**, for polymer-**membrane** fuel cells, are derived from ionomer suspensions or solns. and a catalyst, in which the ionomer suspension or soln. includes ionomer blends from acid or base pairs or, optionally, ionic or covalently crosslinked ionomers, and can be formed using a final hydrolysis or acidolysis step. These assemblies can also contain inorg. (ionic) elec. conductors, hydrophobization agents, **pore** formers, water moderators, cond. mediators, etc., and can include a micro-structured catalyst layer.

IT **27380-27-4DP**, PEK, **sulfonated**, lithium salts
(**electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

RN 27380-27-4 HCA

CN Poly(oxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST ionomer **membrane electrode** assembly polymer fuel cell; gas diffusion **electrode** ionomer polymer fuel cell; elec cond ionomer **membrane electrode** fuel cell

IT Ionomers
(acid-base pairs, **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Ionomers
(acrylic, **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Noble metals
(**electrode** catalysts; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Fuel cell **electrodes**
Fuel cell separators
(ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Polyketones
(polyether-, ionomers, **electrodes**; ionomer-based gas

diffusion **electrodes** for polymer fuel cells)

IT Polyketones
(polyether-, ionomers, sulfo-contg., **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Polyketones
(polyether-, ionomers, sulfo-contg., lithium salt, **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Polyethers, uses
(polyketone-, ionomers, **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Polyethers, uses
(polyketone-, ionomers, sulfo-contg., **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT Polyethers, uses
(polyketone-, ionomers, sulfo-contg., lithium salts, **electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

IT **27380-27-4DP**, PEK, **sulfonated**, lithium salts
(**electrodes**; ionomer-based gas diffusion **electrodes** for polymer fuel cells)

6602,630

L90 ANSWER 2 OF 9 HCA COPYRIGHT 2007 ACS on STN
139:182884 **Membrane electrode** assemblies for electrochemical cells. Gopal, Ramanathan (The Electrosynthesis Company, Inc., USA). PCT Int. Appl. WO 2003069713 A1 20030821, 35 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US1988 20020124.

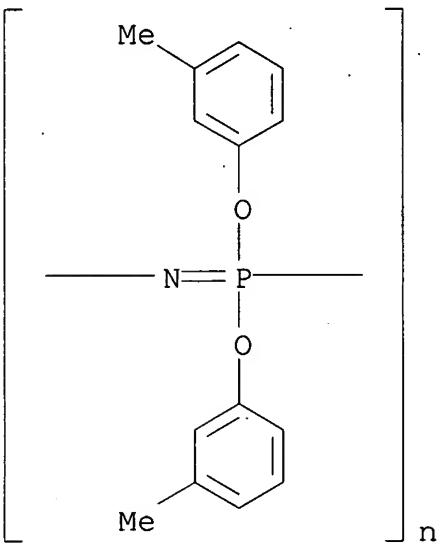
AB **Membrane electrode** assemblies (MEA) comprise an asym. **membrane** composite, a **cathode** and an **anode** in elec. contact with the composite to form solid polymer electrolytes. The asym. **membrane** composites comprise a thin, continuous, nonporous, but water and proton permeable polymeric film layer, an adjacent thicker stratum or layer consisting of a **porous** support backing and a catalyst impregnated mainly in the **porous** support region. The catalyst may be one, for example, that is suitable for the oxidn. of unreacted alc. The MEAs may be employed in both energy producing electrochem. cells, e.g. fuel cells and energy consuming

electrochem. cells for the synthesis of chems. The MEAs may be adapted for direct feed methanol fuel cells and are esp. useful in eliminating crossover of unreacted methanol to the **cathode** and unwanted voltage redn.

IT **52233-65-5D, sulfonated**
(**membrane electrode** assemblies for electrochem. cells)

RN 52233-65-5 HCA

CN Poly[nitrilo[bis(3-methylphenoxy)phosphoranylidyne]] (9CI) (CA INDEX NAME)




IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

ST **membrane electrode** assembly electrochem cell; fuel cell **membrane electrode** assembly

IT Diffusion
(alc.; **membrane electrode** assemblies for electrochem. cells)

IT **Membranes**, nonbiological
(composite; **membrane electrode** assemblies for electrochem. cells)

IT Fuel cells
(direct methanol; **membrane electrode** assemblies for electrochem. cells)

IT Oxidation catalysts
(electrochem.; **membrane electrode** assemblies for electrochem. cells)

IT Alcohols, uses
(fuel; **membrane electrode** assemblies for

electrochem. cells)
IT Electrochemical cells
Electrolytic cells
Fuel cell **electrodes**
Fuel cell electrolytes
Oxidation, electrochemical
(**membrane electrode** assemblies for
electrochem. cells)
IT Cation exchange **membranes**
(permselective; **membrane electrode** assemblies
for electrochem. cells)
IT Fuel cells
(solid electrolyte; **membrane electrode**
assemblies for electrochem. cells)
IT Polyphosphazenes
(sulfonated; **membrane electrode** assemblies
for electrochem. cells)
IT Chemicals
(synthesis; **membrane electrode** assemblies for
electrochem. cells)
IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 11113-84-1,
Ruthenium oxide 11129-89-8, Platinum oxide 12779-05-4
(**membrane electrode** assemblies for
electrochem. cells)
IT 67-56-1, Methanol, uses
(**membrane electrode** assemblies for
electrochem. cells)
IT **52233-65-5D, sulfonated**
(**membrane electrode** assemblies for
electrochem. cells)
IT 64-18-6, Formic acid, processes 302-01-2, Hydrazine, processes
7772-99-8, Stannous chloride, processes 16940-66-2, Sodium
borohydride
(reducing agent; **membrane electrode**
assemblies for electrochem. cells)
IT 68-12-2, Dmf, uses 79-20-9, Acetic acid, methyl ester 127-19-5,
Dimethyl acetamide 872-50-4, n-Methylpyrrolidone, uses
7732-18-5, Water, uses
(solvent; **membrane electrode** assemblies for
electrochem. cells)

L90 ANSWER 3 OF 9 HCA COPYRIGHT 2007 ACS on STN
139:119100 Electrodialysis apparatus comprising ion exchange
**membranes**. Aoki, Ryosuke (Asahi Glass Co., Ltd., Japan).
Jpn. Kokai Tokkyo Koho JP 2003211167 A 20030729, 5 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 2002-10323 20020118.
AB In the title app. comprising desalination chambers and concn.
chambers, sepd. with ion exchange **membranes**; the

**anode** chamber is equipped with a means (e.g. **porous membrane**, ion-permeable **membrane**) for prevention of contacting of the product oxidized materials on the ion exchange **membrane** surfaces. The ion exchange **membranes** are protected from oxidative degrdn. The app. is suitable for use in manuf. of salt from seawater, desalination of brine, soy sauce, etc.

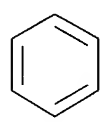
IT **9003-70-7D**, Divinylbenzene-styrene copolymer, **sulfonated**
(cation exchange **membrane**; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)

RN 9003-70-7 HCA

CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH═CH2 ]

CM 2

CRN 100-42-5
CMF C8 H8

H2C═CH—Ph

IC ICM C02F001-469
ICS B01D061-46; B01D071-26; B01D071-36; A23L001-238

CC 47-2 (Apparatus and Plant Equipment)
Section cross-reference(s): 17

ST electrodialyzer ion exchange **membrane** desalination; desalination app food prepn ion exchange **membrane**; ion exchange **membrane** oxidn prevention electrodialyzer

IT Soy sauce
(desalination of; electrodialyzers with means for prevention of

oxidative degrdn. of ion exchange **membranes**)
IT Ion exchange **membranes**
(electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT Dialyzers
(electrodialyzers; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT Alkenes, uses
(fluoro, **porous membrane** for ion exchange **membrane** protection; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes** )
IT Fluoropolymers, uses
Polyolefins
(**porous membrane** for ion exchange **membrane** protection; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes** )
IT Waters
(saline, salt prepn. with; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes** )
IT 9003-70-7, Divinylbenzene-styrene copolymer
(anion exchange **membrane**; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT **9003-70-7D**, Divinylbenzene-styrene copolymer, **sulfonated**
(cation exchange **membrane**; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT 42616-80-8, Selemion CMV 42616-95-5, Selemion AMV
(electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT 7647-14-5, Sodium chloride, processes
(electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes**)
IT 9002-84-0, Polytetrafluoroethylene
(**porous membrane** for ion exchange **membrane** protection; electrodialyzers with means for prevention of oxidative degrdn. of ion exchange **membranes** )

L90 ANSWER 4 OF 9 HCA COPYRIGHT 2007 ACS on STN
130:4638 Substituted α,β,β-trifluorostyrene-based composite **membranes**. Steck, Alfred E.; Stone, Charles (Ballard Power Systems Inc., Can.). U.S. US 5834523 A **19981110**, 13 pp., Cont.-in-part of U.S. 5,498,639.

(English). CODEN: USXXAM. APPLICATION: US 1996-583638 19960105.
PRIORITY: US 1993-124924 19930921; US 1995-442206 19950516.

AB A composite **membrane** is provided in which a **porous** substrate is impregnated with a polymeric compn. comprising various combinations of α,β,β-trifluorostyrene, substituted α,β,β-trifluorostyrene and ethylene-based monomeric units. Where the polymeric compn. includes ion-exchange moieties, the resultant composite **membranes** are useful in electrochem. applications, particularly as **membrane** electrolytes in electrochem. fuel cells.

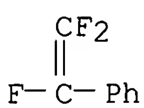
IT **26838-51-7D**, Poly-α,β,β-trifluorostyrene, **sulfonated** **193218-67-6D**, m-Trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer, **sulfonated**
(substituted α,β,β-trifluorostyrene-based composite **membranes**)

RN 26838-51-7 HCA

CN Benzene, (trifluoroethenyl)-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 447-14-3
CMF C8 H5 F3

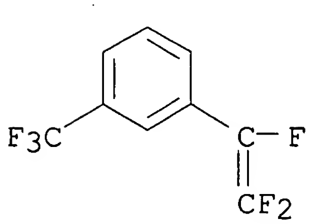



RN 193218-67-6 HCA

CN Benzene, 1-(trifluoroethenyl)-3-(trifluoromethyl)-, polymer with (trifluoroethenyl)benzene (9CI) (CA INDEX NAME)

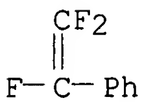
CM 1

CRN 82907-02-6
CMF C9 H4 F6




CM 2

CRN 447-14-3
CMF C8 H5 F3



IC ICM C08J005-22
ICS C08F014-18
INCL 521027000
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST composite **membrane** trifluorostyrene polymer; fuel cell **electrode** composite **membrane**
IT **Membranes**, nonbiological
(composite; substituted α,β,β-trifluorostyrene-based composite **membranes**)
IT Fluoropolymers, uses
Polyolefins
(**porous** polymeric sheet; substituted α,β,β-trifluorostyrene-based composite **membranes**)
IT Fuel cells
Ion exchange **membranes**
**Membrane electrodes**
(substituted α,β,β-trifluorostyrene-based composite **membranes**)
IT Fluoropolymers, uses
(substituted α,β,β-trifluorostyrene-based composite **membranes**)
IT 9002-84-0, Polytetrafluoroethylene 9002-88-4, Polyethylene 9003-07-0, Polypropylene 24937-79-9, Polyvinylidene fluoride 25038-71-5, Ethylene-tetrafluoroethylene copolymer 25067-11-2, Tetrafluoroethylene-hexafluoropropylene copolymer
(**porous** polymeric sheet; substituted α,β,β-trifluorostyrene-based composite **membranes**)
IT **26838-51-7D**, Poly-α,β,β-trifluorostyrene, **sulfonated** 188050-58-0D, p-Sulfonyl fluoride-α,β,β-trifluorostyrene-m-trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer, hydrolyzed **193218-67-6D**, m-Trifluoromethyl-α,β,β-trifluorostyrene-α,β,β-trifluorostyrene copolymer, **sulfonated**
(substituted α,β,β-trifluorostyrene-based composite **membranes**)

L90 ANSWER 5 OF 9 HCA COPYRIGHT 2007 ACS on STN
127:334149 Gas-diffusion **electrode** for electrochemical cell and fuel cell using this **electrode**. Serpico, Joseph M.; Ehrenberg, Scott G.; Wnek, Gary E.; Tangredi, Timothy N. (Dais Corp., USA). U.S. US 5677074 A **19971014**, 6 pp. (English). CODEN: USXXAM. APPLICATION: US 1996-673661 19960625.

AB The **electrode** includes a **porous** body in contact with a catalyst layer comprising a catalyst dispersed on the surface of a C support; a H2O-insol. sulfonated polystyrene, sulfonated poly(α-methylstyrene), or sulfonated styrene-ethylene-butylene-styrene (SEBS) block copolymer; and a nonionic fluorocarbon polymer. The fuel cell includes 2 of these **electrodes**, a **membrane** of a proton-conducting polymer between the **electrodes** an inlet for a gaseous fuel, an inlet for an O-contg. gas, and an outlet for reaction products.

IT **9003-53-6D**, Polystyrene, **sulfonated**
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
RN 9003-53-6 HCA
CN Benzene, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

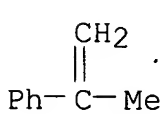
CRN 100-42-5
CMF C8 H8

$H_2C{=}CH{-}Ph$

IT **25014-31-7D**, Poly(α-methylstyrene), **sulfonated**
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
RN 25014-31-7 HCA
CN Benzene, (1-methylethenyl)-, homopolymer (CA INDEX NAME)

CM 1

CRN 98-83-9
CMF C9 H10

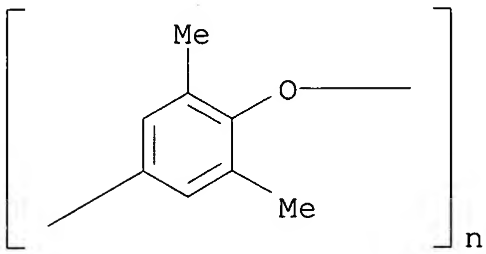


IC ICM H01M004-92
ICS H01M008-10

INCL 429043000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST gas diffusion **electrode** electrochem cell; fuel cell gas diffusion **electrode**; polystyrene sulfonated gas diffusion **electrode**; polymethylstyrene sulfonated gas diffusion **electrode**; SEBS rubber sulfonated gas diffusion **electrode**; fluoropolymer gas diffusion catalytic **electrode**
IT Fluoropolymers, uses
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT Fluoropolymers, uses
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT **Electrodes**
(gas-diffusion; for electrochem. cell and fuel cell using them)
IT Styrene-butadiene rubber, uses
(hydrogenated, block, sulfonated; gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT 9002-84-0, PTFE **9003-53-6D**, Polystyrene, **sulfonated**
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT **25014-31-7D**, Poly(α-methylstyrene), **sulfonated**
(gas-diffusion **electrode** for electrochem. cell and fuel cell using them)
IT 106107-54-4
(styrene-butadiene rubber, hydrogenated, block, sulfonated; gas-diffusion **electrode** for electrochem. cell and fuel cell using them)

L90 ANSWER 6 OF 9 HCA COPYRIGHT 2007 ACS on STN
124:181119 Thin-film composite **membrane** as battery separator or coating on battery **electrodes**. Chowdhury, Geeta; Adams, William; Conway, Brian; Sourirajan, Srinivasa (Can.). Can. Pat. Appl. CA 2125840 A1 **19951215**, 29 pp. (English). CODEN: CPXXEB. APPLICATION: CA 1994-2125840 19940614.
AB The ion-selective **membrane** comprises a polymer substrate **membrane** coated with a polyarom. ether. The substrate **membrane** having a **porosity**, elec. resistance and wettability suitable for use as a battery separator is Celgard 3559, and polyarom. ether is sulfonated poly(2,6-dimethyl-1,4-phenylene

oxide), SPPO.
IT **24938-67-8D**, Poly(2,6-dimethyl-1,4-phenylene oxide), **sulfonated**
(battery separator or coating on battery **electrodes** from ion-selective **membrane** coated with)
RN 24938-67-8 HCA
CN Poly[oxy(2,6-dimethyl-1,4-phenylene)] (CA INDEX NAME)



IC ICM H01M002-16
ICS H01M006-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST battery separator composite **membrane; electrode** battery coating composite **membrane;** Celgard polyarom ether coating composite **membrane;** polydimethylphenylene oxide sulfonated coating composite **membrane**
IT **Electrodes**
(battery, thin film composite **membrane** as coating on)
IT Batteries, secondary
(separators, thin film composite **membrane** as)
IT **24938-67-8D**, Poly(2,6-dimethyl-1,4-phenylene oxide), **sulfonated**
(battery separator or coating on battery **electrodes** from ion-selective **membrane** coated with)
IT 9004-35-7, Cellulose acetate
(battery separator or coating on battery **electrodes** from ion-selective **membrane** coated with polyarom. ether and)
IT 9003-07-0, Polypropylene
(polyarom. ether-coated thin film composite **membrane** as battery separator or coating on battery **electrodes**)

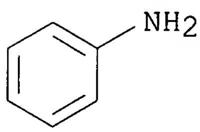
L90 ANSWER 7 OF 9 HCA COPYRIGHT 2007 ACS on STN
116:110054 Preparation of dry cells using polypyrrole and polyaniline composites. Dalas, E. (Dep. Chem., Univ. Patras, Patras, 26110, Greece). Journal of Materials Science, 27(2), 453-7 (English) **1992**. CODEN: JMTSAS. ISSN: 0022-2461.
AB Composite conducting materials, consisting of polypyrrole and polyaniline incorporated into an inorg. or polymer matrix were

prepd. Low-cost, dry cells were fabricated by gluing the composite conducting **membrane** on Mg or Al foils. The charge-discharge efficiency and emf. of the cells were 0.5-13.8 mW-h/cm3 and 0.5-2.0 V, resp.

IT **25233-30-1D**, Polyaniline, **sulfonated**
    (elec. cond. of, dry cell battery use in relation to)
RN 25233-30-1 HCA
CN Benzenamine, homopolymer (CA INDEX NAME)

CM 1

CRN 62-53-3
CMF C6 H7 N



IT **9003-53-6D**, Polystyrene, **sulfonated**
**9003-70-7D**, Divinylbenzene-styrene copolymer, **sulfonated**
    (polypyrrole and polyaniline composites, for dry cells)
RN 9003-53-6 HCA
CN Benzene, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

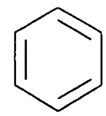
CRN 100-42-5
CMF C8 H8

$H_2C{=}CH{-}Ph$

RN 9003-70-7 HCA
CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH=CH2 ]

CM 2

CRN 100-42-5
CMF C8 H8

$H_2C$=CH—Ph

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT Electric conductors, polymeric
(polyaniline and polypyrrole composites of inorg. or polymeric **porous** carriers, for dry cells)
IT Filter paper
Filters and Filtering materials, micro-, **membranes**
(polypyrrole and polyaniline composites, for dry cells)
IT Polyamines
(aniline-based, composites, with inorg. or polymeric **porous** carriers, dry cell batteries with)
IT **Cathodes**
(battery, polypyrrole and polyaniline composites, with inorg. or polymeric **porous** carriers, magnesium dry cells with)
IT Batteries, primary
(dry-cell, with polypyrrole and polyaniline composites of inorg. or polymeric **porous** carriers, prepn. of)
IT 7429-90-5, Aluminum, uses 7439-95-4, Magnesium, uses
(**anodes**, dry cells with polypyrrole and polyaniline composites of inorg. or polymeric **porous** carrier **cathode** and, performance of)
IT 25233-30-1, Polyaniline 30604-81-0, Polypyrrole
(composites, with inorg. polymer **porous** carriers, dry cell battery using)
IT **25233-30-1D**, Polyaniline, **sulfonated**
30604-81-0D, Polypyrrole, sulfonated
(elec. cond. of, dry cell battery use in relation to)
IT 9002-89-5, Polyvinyl alcohol **9003-53-6D**, Polystyrene,

**sulfonated 9003-70-7D**, Divinylbenzene-styrene
copolymer, **sulfonated**
(polypyrrole and polyaniline composites, for dry cells)

L90 ANSWER 8 OF 9 HCA COPYRIGHT 2007 ACS on STN
105:194600 Fuel cells with cation-exchange resin electrolytes.
Mukoyama, Yoshiyuki; Hirai, Osamu; Kobayashi, Yuji (Hitachi Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 61078067 A **19860421** Showa, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1984-200248 19840925.

AB Fuel cells use electrolytes that are prepd. from particles of strongly acidic cation-exchange resins contg. 0.8-5.0 mol% crosslinking agents and which ionize in $H_2O$. The use of the electrolyte eliminates unwanted transfer and leakage, which result in diln. of the fuel and decrease in the cell efficiency. Thus, styrene 179, a mixt. of divinylbenzene-40% monoethylvinylbenzene 13, PhMe 115, $Bz_2O_2$ 10 g, 10% aq. suspension of insol. $Ca_3(PO_4)_2$ 300 mL, and $H_2O$ 1.4 L were homogenized with increase in temp. and held at 70° for 1 h. Further polymn. at 80-85° for 4 h gave **porous** particles (contg. ≥50% 10-20-μ particles), which were washed with dil. HCl and dried. Sulfonation in 300 g $C_2H_4Cl_2$ and 97% $H_2SO_4$ gave cation-exchange resin having exchange capacity of 4.3 mequiv/g and degree of crosslinking of 3.3 mol%. The resin particles were made into a paste with addn. of $H_2O$ and SiC powder, and filled into the cavity between the fuel (MeOH) **anode** and an ion-exchange **membrane** covering the oxidant (air) **cathode**. The obtained fuel cell was operated without diln. of MeOH, and showed excellent performance. Supply of the fuel in this cell was also simplified.

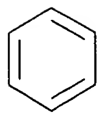
IT **9003-70-7D, sulfonated 9052-95-3D,**
**sulfonated**
(crosslinked, cation-exchange resin, for fuel-cell electrolyte)

RN 9003-70-7 HCA

CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH═CH2 ]

CM 2

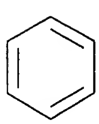
CRN 100-42-5
CMF C8 H8

$H_2C$═CH—Ph

RN 9052-95-3 HCA
CN Benzene, diethenyl-, polymer with ethenylbenzene and ethenylethylbenzene (CA INDEX NAME)

CM 1

CRN 28106-30-1
CMF C10 H12
CCI IDS



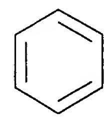
D1—CH═CH2

D1—Et

CM 2

CRN 1321-74-0
CMF C10 H10

CCI IDS



2 [ D1—CH=CH2 ]

CM 3

CRN 100-42-5
CMF C8 H8

$H_2C$=CH—Ph

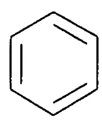
IC ICM H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT **9003-70-7D, sulfonated 9052-95-3D, sulfonated**
(crosslinked, cation-exchange resin, for fuel-cell electrolyte)

L90 ANSWER 9 OF 9 HCA COPYRIGHT 2007 ACS on STN
89:119785 Electrolysis of aqueous alkali metal chloride. Motani, Kensuke (Tokuyama Soda Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 53039997 **19780412** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1976-114628 19760927.
AB Aq. alkali metal chloride in the upper chamber, aq. caustic alkali in the middle chamber, and gas under the bottom **cathode** are electrolyzed in a horizontal cell divided by a cation-exchanging or H2O-permeable **porous membranes** to obtain a **cathode** effluent of ≥3N alkali metal chloride. Thus, aq. NaCl in the upper, 4.2N NaOH in the middle chamber in a cell divided with **Nafion** 427 (100 + 100 mm) and sulfonated styrene-divinylbenzene **membranes** were electrolyzed using a RuO2-TiO2-Ti **anode** and a soft steel net **cathode**, at 70° and 20 A/dm2 to obtain 3.5N NaCl, 12N NaOH, and 96% Cl at 78.5% current efficiency, vs. 2.5N NaCl, 13N NaOH, and 89.5% Cl with 74.8 without the latter **membrane**.
IT **9003-70-7D, sulfonated**
(diaphragm, in cells for brine electrolysis)

RN 9003-70-7 HCA
CN Benzene, diethenyl-, polymer with ethenylbenzene (CA INDEX NAME)

CM 1

CRN 1321-74-0
CMF C10 H10
CCI IDS



2 [ D1—CH=CH2 ]

CM 2

CRN 100-42-5
CMF C8 H8

$H_2C{=}CH-Ph$

IC C25B001-46
CC 72-10 (Electrochemistry)
Section cross-reference(s): 49
ST brine electrolysis diaphragm cell; cation exchange cell brine electrolysis; styrene divinylbenzene sulfonated **membrane** electrolysis; vinylbenzene styrene sulfonated **membrane** electrolysis
IT Cation exchangers
(**membranes**, for brine electrolysis)
IT **9003-70-7D, sulfonated** 65931-59-1
(diaphragm, in cells for brine electrolysis)

=> D L91 1-14 CBIB ABS HITSTR HITIND

L91 ANSWER 1 OF 14 HCA COPYRIGHT 2007 ACS on STN
140:202495 Method of plating metal leafs and metal **membranes**.
Erlebacher, Jonah; Ding, Yi (Johns Hopkins University, USA). PCT Int. Appl. WO 2004021481 A1 20040311, 35 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO,

CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2.
APPLICATION: WO 2003-US24808 20030827. PRIORITY: US 2002-406065P 20020827; US 2003-647436 20030826.

AB A method of plating a **nanoporous** metal **membrane** is provided where at least a portion of the **nanoporous** metal member is freely supported on the surface of a metal plating soln. contg. at least one platable metal and the surface of the metal plating soln. is contacted with a plating initiator. The **nanoporous** metal **membrane** is allowed to contact the plating soln. for a period of time effective to plate at least a portion of the **nanoporous** metal **membrane** with the at least one platable metal. The plating initiator is preferably hydrazine.

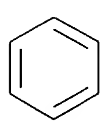
IT **50851-57-5**
(method of plating metal leafs and metal **membranes**)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH═CH2

D1—SO3H

IC ICM H01M004-00
ICS H01M004-02; C25D003-00; B32B015-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

ST fuel cell metal **membrane** leaf plating

IT Coating process
(electroless; method of plating metal leafs and metal **membranes**)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; method of plating metal leafs and metal **membranes**)
IT Polymer electrolytes
(**membrane**; method of plating metal leafs and metal **membranes**)
IT Electrodeposition
Fuel cell **electrodes**
Fuel cell electrolytes
**Membranes**, nonbiological
Vapor deposition process
(method of plating metal leafs and metal **membranes**)
IT Thiols, uses
(method of plating metal leafs and metal **membranes**)
IT Noble metals
(method of plating metal leafs and metal **membranes**)
IT Sulfonic acids, uses
(perfluoro; method of plating metal leafs and metal **membranes**)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; method of plating metal leafs and metal **membranes**)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; method of plating metal leafs and metal **membranes**)
IT Fuel cells
(solid electrolyte; method of plating metal leafs and metal **membranes**)
IT Perfluoro compounds
(sulfonic acids; method of plating metal leafs and metal **membranes**)
IT 302-01-2, Hydrazine, processes 12325-31-4 16941-12-1, Hexachloroplatinic acid
(method of plating metal leafs and metal **membranes**)
IT 112-55-0, 1-Dodecanethiol 53193-23-0, 1-Nonadecanethiol
(method of plating metal leafs and metal **membranes**)
IT 7439-88-5, Iridium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-48-4, Cobalt, uses 7440-57-5, Gold, uses **50851-57-5**
(method of plating metal leafs and metal **membranes**)

L91 ANSWER 2 OF 14 HCA COPYRIGHT 2007 ACS on STN
138:30831 Flexible electrochromic structure and methods for the production thereof. Hourquebie, Patrick; Topart, Patrice; Pages,

Hubert (Commissariat a l'Energie Atomique, Fr.). PCT Int. Appl. WO 2002097519 A2 **20021205**, 34 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (French). CODEN: PIXXD2. APPLICATION: WO 2002-FR1807 20020529. PRIORITY: FR 2001-7144 20010531.

AB The invention relates to a flexible electrochromic structure which operates as a reflector at wavelengths ranging from (0,35) to ( 20) µm. The inventive structure comprises a **microporous membrane** including an electrolyte and the following items successively disposed in the following order on each of the surfaces of said **microporous membrane** in a sym. manner in relation to said **membrane**: a layer forming a reflecting **electrode**, an electrochromic conductive polymer layer, and a flexible transparent window at wavelengths ranging from (0,35) and (20) µm.

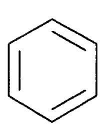
IT **50851-57-5**
(dopant for conducting polymer; electrochromic device with)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

IT **28038-50-8**, Sodium poly(4-styrenesulfonate)
(electrochromic device with)

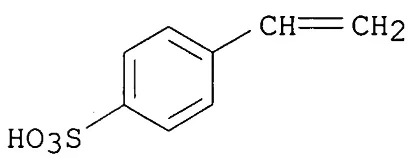
RN 28038-50-8 HCA
CN Benzenesulfonic acid, 4-ethenyl-, homopolymer, sodium salt (CA INDEX NAME)

CM 1

CRN 28210-41-5
CMF (C8 H8 O3 S)x
CCI PMS

CM 2

CRN 98-70-4
CMF C8 H8 O3 S



IC ICM G02F
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 36
IT Conducting polymers
Electrochromic devices
**Electrodes**
Electrolytes
Heat transfer
Optical reflectors
(electrochromic device with)
IT **Membranes**, nonbiological
(**microporous**; electrochromic device with)
IT Metals, uses
Noble metals
(reflecting **electrodes**; electrochromic device with)
IT 1330-69-4, Dodecylbenzenesulfonate 16722-51-3, Tosylate, uses 26101-52-0 27119-07-9 **50851-57-5** 50852-11-4, Naphthalene sulfonate
(dopant for conducting polymer; electrochromic device with)
IT **28038-50-8**, Sodium poly(4-styrenesulfonate) 126213-50-1, 3,4-Ethylenedioxythiophene
(electrochromic device with)
IT 7440-06-4, Platinum, uses 7440-22-4, Silver, uses 7440-57-5, Gold, uses
(reflecting **electrodes**; electrochromic device with)

L91 ANSWER 3 OF 14 HCA COPYRIGHT 2007 ACS on STN
136:207399 Semiconducting polymer inverse opals prepared by electropolymerization. Cassagneau, Thierry; Caruso, Frank (Max Planck Institute of Colloids and Interfaces, Potsdam, D-14424, Germany). Advanced Materials (Weinheim, Germany), 14(1), 34-38 (English) **2002**. CODEN: ADVMEW. ISSN: 0935-9648. Publisher: Wiley-VCH Verlag GmbH.

AB A simple method for the prepn. of high-quality semiconducting polymer inverse opal films with well-defined **pore** structures is described. The prepn. of polymer inverse opals usually requires good mech. stability of the photonic crystal template, which is often obtained by sintering when SiO2 particles are used for by centrifugation/filtration of particles on a **membrane** filter while infiltrating the crystal with monomers. The **electrode** prepn. involved the formation of colloidal crystals of polystyrene microparticles on an optically transparent conductive substrate, passivation of the remaining uncovered surface, and electropolymn. The resulting film is dried under N prior to exposure to THF and dissoln. of the particles to obtain an adhered film (A) or directly exposed to THF without drying (B) to trigger peeling from the substrate and obtain free-standing inverse opal polymer films. The presented method allows the control of the film thickness, depending on the electropolymn. time and applied potential. The produced inverse opals are suitable for application in chem.- and biosensing. Thus, the semiconducting polymer inverse opals are used as matrixes for fabricating chem.- and biosensors.

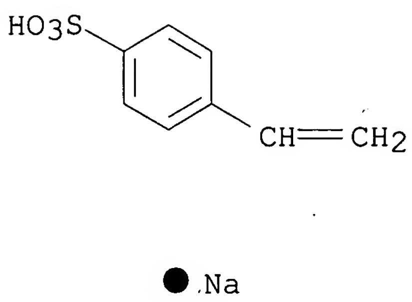
IT **25704-18-1**, Poly(sodium-4-styrenesulfonate)
(semiconducting polymer inverse opals prepd. by electropolymn.)

RN 25704-18-1 HCA

CN Benzenesulfonic acid, 4-ethenyl-, sodium salt (1:1), homopolymer (CA INDEX NAME)

CM 1

CRN 2695-37-6
CMF C8 H8 O3 S . Na




CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 8, 65, 72

IT **25704-18-1**, Poly(sodium-4-styrenesulfonate)
(semiconducting polymer inverse opals prepd. by electropolymn.)

L91 ANSWER 4 OF 14 HCA COPYRIGHT 2007 ACS on STN

136:156525 A biocompatible biomaterial comprising a phospholipid-based artificial **membrane**. Chaikof, Elliot L.; Feng, June; Orban, Janine M.; Liu, Hongbo; Sun, Xue Long; Faucher, Keith M. (Emory University, USA). PCT Int. Appl. WO 2002009647 A2 **20020207**, 117 pp. DESIGNATED STATES: W: AU, CA, JP, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US24020 20010730. PRIORITY: US 2000-221828P 20000728; US 2000-221618P 20000728; US 2000-221655P 20000728.

AB A biocompatible biomaterial (or biol. component) is provided comprising a **membrane**-mimetic surface (film) covering a substrate. Suitable substrates include hydrated substrates, e.g., hydrogels which may contain drugs for delivery to a patient through the **membrane**-mimetic film, or may be made up of cells, such as islet cells, for transplantation. The surface may present exposed bioactive mols. or moieties for binding to target mols. in vivo, for modulating host response when implanted into a patient (e.g. the surface may be antithrombogenic or antiinflammatory) and the surface may have **pores** of selected sizes to facilitate transport of substances through it. An optional hydrophilic cushion or spacer between the substrate and the **membrane**-mimetic surface allows transmembrane proteins to extend from the surface through the hydrophilic cushion, mimicking the structure of naturally-occurring cells. An alkylated layer directly beneath the **membrane**-mimetic surface facilitates bonding of the surface to the remainder of the biol. component. Alkyl chains may extend entirely through the hydrophilic cushion when present. To facilitate binding, the substrate may optionally be treated with a polyelectrolyte or alternating layers of oppositely-charged

polyelectrolytes to facilitate charged binding of the **membrane**-mimetic film or alkylated layer beneath the **membrane**-mimetic film to the substrate. The **membrane**-mimetic film is preferably made by in situ polymn. of phospholipid vesicles. For example, a stabilized, polymeric **membrane**-mimetic surface was produced on an alkylated polyelectrolyte multilayer by in situ photopolymn. of a lipid assembly. Mol. characterization confirmed the generation of a well-ordered supported lipid monolayer, which was stable under high shear flow conditions and capable of modulating interfacial mol. transport. In addn., the ability to use this system as a cell encapsulation barrier was illustrated. The addn. of a stable, supported lipid **membrane** provides an addnl. mechanism for controlling both the physiochem. and biol. properties of a polyelectrolyte multilayer, thus making it possible to optimize the clin. performance characteristics of artificial organs and other implanted medical devices.

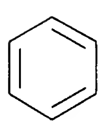
IT **146847-38-3P**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

RN 146847-38-3 HCA

CN 2-Propenoic acid, 2-hydroxyethyl ester, polymer with ethenylbenzenesulfonic acid (9CI) (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS

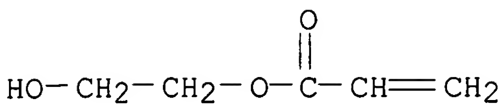


D1— CH═CH2

D1— SO3H

CM 2

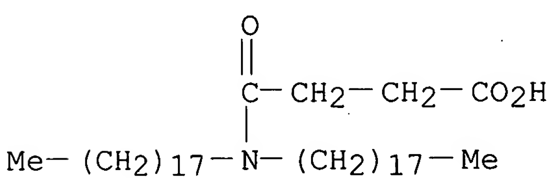
CRN 818-61-1
CMF C5 H8 O3



IT **395655-71-7P**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
RN 395655-71-7 HCA
CN 2-Propenoic acid, 2-hydroxyethyl ester, polymer with ethenylbenzenesulfonic acid, 4-(dioctadecylamino)-4-oxobutanoate (9CI) (CA INDEX NAME)

CM 1

CRN 37519-63-4
CMF C40 H79 N O3

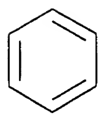


CM 2

CRN 146847-38-3
CMF (C8 H8 O3 S . C5 H8 O3)x
CCI PMS

CM 3

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

CM 4

CRN 818-61-1
CMF C5 H8 O3

```
                        O
                        ||
HO—CH2—CH2—O—C—CH=CH2
```

IT **395652-97-8**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
RN 395652-97-8 HCA
CN Butanoic acid, 4-(dioctadecylamino)-4-oxo-, 2-[(1-oxo-2-propenyl)oxy]ethyl ester, polymer with ethenylbenzenesulfonic acid and 2-hydroxyethyl 2-propenoate (9CI) (CA INDEX NAME)

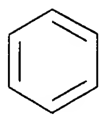
CM 1

CRN 195819-94-4
CMF C45 H85 N O5

```
                 O            O                 O
                 ||           ||                ||
                 C—CH2—CH2—C—O—CH2—CH2—O—C—CH=CH2
                 |
Me—(CH2)17—N—(CH2)17—Me
```

CM 2

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=$CH_2$

D1—$SO_3H$

CM 3

CRN 818-61-1
CMF C5 H8 O3

HO—$CH_2$—$CH_2$—O—C(=O)—CH=$CH_2$

IC ICM A61K
CC 63-8 (Pharmaceuticals)
Section cross-reference(s): 23, 35
ST phospholipid polymn **membrane** mimetic biomaterial biocompatibility
IT Animal cell line
(CHO-K1; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Animal cell line
(CHO; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Receptors
(EPCR (endothelial cell protein C receptor); polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Histocompatibility antigens
(HLA-G; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Testis
(Sertoli cell, substrates; polymd. phospholipid vesicles as

**membrane**-mimetic surfaces for biocompatible biomaterials)
IT Complement
(activation; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Macrophage
(adhesion; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Prosthetic materials and Prosthetics
(antithrombogenic; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Blood vessel
Blood vessel
Bone
Cartilage
Heart
Joint, anatomical
Kidney
Ligament
Liver
Lung
Organ, animal
Tendon
(artificial; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT **Electrodes**
(bioelectrodes; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Polymers, biological studies
(block; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Medical goods
(catheters; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Parathyroid gland
Thyroid gland
(cells, substrates; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Glycosaminoglycans, biological studies
(conjugates with lipids; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Oligosaccharides, biological studies
Peptides, biological studies
(conjugates, with lipids; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Lipids, biological studies
(conjugates, with peptides or polysaccharides; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Blood vessel
(endothelium; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Fluoropolymers, biological studies
(expanded, vascular grafts; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Receptors
(extracellular matrix-assocd. protein; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Circulation
(extracorporeal, **membrane** oxygenators; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Animal cell
(genetically engineered secreting, substrates; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT T cell (lymphocyte)
(helper cell/inducer, TH1, interaction with; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT T cell (lymphocyte)
(helper cell/inducer, TH2, interaction with; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Dialysis
(hemodialysis, tubing; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Dialyzers
(hemodialyzers, **membranes**; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Liver
(hepatocyte, substrates; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Fibers
(hollow; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Prosthetic materials and Prosthetics
(implants; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)
IT Animal tissue
Blood
Organ, animal
(interaction with; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Liposomes

(large unilamellar; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT RGD peptides
(lipopeptides; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Lipopeptides
Phosphopeptides
(lipophosphopeptides; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Proteins
(mercapto-contg., targeting moieties; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Encapsulation
(microencapsulation; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Nanostructures
Spheres
(nanospheres; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Albumins, biological studies
Dendritic polymers
(particles; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Crosslinking
(photochem., of lipids; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Polymerization
(photopolymn.; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Adhesion, biological
Anticoagulants
Antidiabetic agents
Biological transport
Coacervation
Dissolution
Drug delivery systems
Drug delivery systems
Encapsulation
Eyeglass lenses
Fibrinolytics
Intraocular lenses
**Membrane**, biological
Microcapsules
Microspheres
Particle size
Particles
Platelet aggregation inhibitors

Polyelectrolytes
  **Pore** size
  **Porosity**
Self-assembly
Transplant and Transplantation
Transplant rejection
   (polymd. phospholipid vesicles as **membrane**-mimetic
   surfaces for biocompatible biomaterials)
IT Phospholipids, biological studies
   (polymd. phospholipid vesicles as **membrane**-mimetic
   surfaces for biocompatible biomaterials)
IT Annexins
Collagens, biological studies
Gelatins, biological studies
Glycophospholipids
Interleukin 10
Phosphatidylcholines, biological studies
Phosphatidylethanolamines, biological studies
Polyoxyalkylenes, biological studies
Thrombomodulin
Transport proteins
   (polymd. phospholipid vesicles as **membrane**-mimetic
   surfaces for biocompatible biomaterials)
IT Phospholipids, biological studies
   (polymers; polymd. phospholipid vesicles as **membrane**
   -mimetic surfaces for biocompatible biomaterials)
IT Inflammation
   (redn. of; polymd. phospholipid vesicles as **membrane**
   -mimetic surfaces for biocompatible biomaterials)
IT Albumins, biological studies
   (serum; polymd. phospholipid vesicles as **membrane**
   -mimetic surfaces for biocompatible biomaterials)
IT Medical goods
   (stents, biliary and vascular; polymd. phospholipid vesicles as
   **membrane**-mimetic surfaces for biocompatible biomaterials)
IT Hydrogels
Neuron
Pancreatic islet of Langerhans
   (substrates; polymd. phospholipid vesicles as **membrane**
   -mimetic surfaces for biocompatible biomaterials)
IT Polysaccharides, biological studies
Proteins
   (substrates; polymd. phospholipid vesicles as **membrane**
   -mimetic surfaces for biocompatible biomaterials)
IT Agglutinins and Lectins
Antibodies and Immunoglobulins
Enzymes, biological studies
Peptides, biological studies

(targeting moieties; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Avidins
(targeting moiety; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Medical goods
(tubes, dialysis; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Heart
(valve, artificial; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT Endothelium
(vascular; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)

IT Transplant and Transplantation
(xenotransplant, islets; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 25104-18-1, Poly(L-lysine) 38000-06-5, Poly(L-lysine)
(coatings; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)

IT 9002-84-0, PTFE
(expanded, vascular grafts; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 62229-50-9, EGF
(fragment; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)

IT 112-04-9, Octadecyltrichlorosilane
(glass surface alkylated with; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 9000-94-6, Antithrombin III 9002-04-4, Thrombin 60202-16-6, Protein C 106096-93-9, Basic fibroblast growth factor
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT **146847-38-3P**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 9005-32-7DP, Alginic acid, copolymer with polylysine 25104-18-1DP, Poly(L-lysine), copolymer with alginate 38000-06-5DP, Poly(L-lysine), copolymer with alginate 195819-96-6P 195819-98-8P 395652-98-9P 395652-99-0P **395655-71-7P**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 56-87-1, L-Lysine, biological studies 63-89-8, Dipalmitoylphosphatidylcholine 4235-95-4, DOPC 7440-57-5, Gold, biological studies 8001-27-2, Hirudin 9003-01-4, Polyacrylic acid 9003-05-8, Polyacrylamide 9003-39-8, Polyvinylpyrrolidone 9003-53-6, Polystyrene 9004-61-9, Hyaluronan 9004-61-9D, Hyaluronan, conjugates with lipids 9005-49-6, Heparin, biological

studies 9007-28-7, Chondroitin sulfate 9050-30-0, Heparan sulfate 9056-36-4, Keratan sulfate 24967-94-0, Dermatan sulfate 25322-68-3, Polyethylene oxide 26662-91-9, Palmitoyloleoylphosphatidylcholine 195065-49-7 195065-50-0 195819-91-1 225239-50-9 **395652-97-8**
(polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 9004-10-8, Insulin, biological studies
(release of, from encapsulated islets; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 9005-32-7, Alginic acid 9012-76-4, Chitosan
(substrate; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)

IT 9013-20-1, Streptavidin
(targeting moiety; polymd. phospholipid vesicles as **membrane**-mimetic surfaces for biocompatible biomaterials)

IT 9000-95-7, ATP diphosphohydrolase
(vascular; polymd. phospholipid vesicles as **membrane** -mimetic surfaces for biocompatible biomaterials)

L91 ANSWER 5 OF 14 HCA COPYRIGHT 2007 ACS on STN

136:78371 Electrochemical capacitor.. Haas, Cornelius; Boehmisch, Mathias; Scherber, Werner (Dornier Gmbh, Germany). Ger. DE 10053276 C1 **20020110**, 10 pp. (German). CODEN: GWXXAW. APPLICATION: DE 2000-10053276 20001027.

AB According to the invention, the capacitor has the following characteristics:the **electrode** is formed from a nano-structured film contg. discrete, needle-shaped elements anchored to the surface in an elec. conducting way. The electrolyte is a thin film electrolyte covering the **electrode** as a layer, preventing elec. contact between the **electrode** and the counter **electrode**. The discrete, needle-shaped elements, covered by the electrolyte, are embedded in the counter **electrode**. The procedure for the prodn. of the capacitor is described in the invention.

IT **9080-79-9**
(electrochem. capacitor)

RN 9080-79-9 HCA

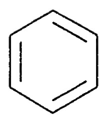
CN Benzenesulfonic acid, ethenyl-, homopolymer, sodium salt (9CI) (CA INDEX NAME)

CM 1

CRN 50851-57-5
CMF (C8 H8 O3 S)x
CCI PMS

CM 2

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

IC ICM H01G009-155
ICS H01G009-038; H01G009-058; B82B001-00
CC 76-3 (Electric Phenomena)
Section cross-reference(s): 72
ST electrochem capacitor **electrode** electrolyte
IT **Membranes,** nonbiological
(ceramic nano-**porous membrane**; electrochem.
capacitor)
IT Electric conductors
**Electrodes**
Electrolytes
Nanocrystals
Oxidation, electrochemical
Polyelectrolytes
(electrochem. capacitor)
IT 64-17-5, Ethanol, uses 67-66-3, Chloroform, uses **9080-79-9**
71550-12-4
(electrochem. capacitor)
IT 7440-57-5, Gold, processes
(**electrode** material; electrochem. capacitor)
IT 1344-28-1, Alumina, processes
(**porous** film; electrochem. capacitor)

L91 ANSWER 6 OF 14 HCA COPYRIGHT 2007 ACS on STN
132:110489 Ionic conductivity and electrochemical characterization of novel **microporous** composite polymer electrolytes. Xu, Wu; Siow, Kok Siong; Gao, Zhiqiang; Lee, Swee Yong (Department of Chemistry, National University of Singapore, Singapore, 119260, Singapore). Journal of the Electrochemical Society, 146(12),

4410-4418 (English) **1999**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB Composite polymer electrolytes (CPEs) have been prepd. by encapsulating electrolyte solns. of inorg. lithium salts dissolved in a plasticizer or mixt. of plasticizers such as ethylene carbonate (EC), propylene carbonate (PC), γ-butyrolactone (BL) and di-Me carbonate (DMC), into **porous** polymer **membranes**. These polymer **membranes** are obtained from microemulsion polymn. of the microemulsion system of acrylonitrile, 4-vinylbenzenesulfonic acid lithium salt, ethylene glycol dimethacrylate (as cross-linker), ω-methoxy poly(ethyleneoxy)40 undecyl-α-methacrylate (as surfactant), and water. These CPEs exhibit conductivities of 3.1 + 10-4 to 1.2 + 10-3 S cm-1 at room temp. The lithium ion transference no., measured using a dc polarization method coupled with ac impedance spectroscopy, is found to be ca. 0.45. Cyclic voltammetry of the CPEs on stainless steel **electrodes** shows electrochem. stability windows extending up to 3.9, 4.0, and 4.4 V vs. Li+/Li for CPEs with 1M LiSO3CF3/EC-PC (1:1 by vol.), 1M LiBF4/BL and 1M LiClO4/EC-DMC (1:1 by vol.), resp. The impedance of the Li/CPE interface for the CPE with 1M LiClO4/EC-DMC under open circuit conditions is found to increase over storage time. Preliminary charge-discharge tests of prototype Li/CPE/LiMn2O4 cells show an initial discharge capacity of ca. 118 mAh g-1 of LiMn2O4 at a discharge current rate of 0.10 mA cm-2, and promising cyclability.

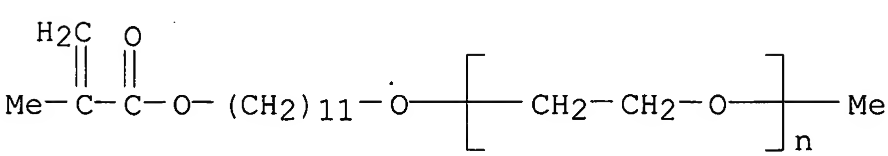
IT **237770-04-6D**, polyoxyalkylene-acrylate complexes
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)

RN 237770-04-6 HCA

CN 2-Propenoic acid, 2-methyl-, 1,2-ethanediyl ester, polymer with lithium 4-ethenylbenzenesulfonate, α-methyl-ω-[[11-[(2-methyl-1-oxo-2-propenyl)oxy]undecyl]oxy]poly(oxy-1,2-ethanediyl) and 2-propenenitrile (9CI) (CA INDEX NAME)

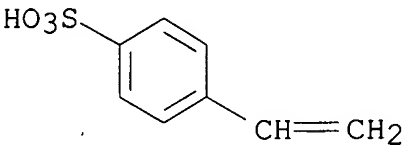
CM 1

CRN 174508-47-5
CMF (C2 H4 O)n C16 H30 O3
CCI PMS



CM 2

CRN 4551-88-6
CMF C8 H8 O3 S . Li




● Li

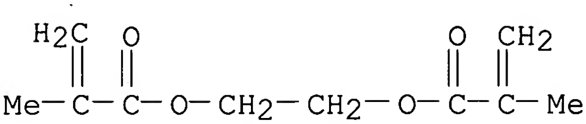
CM 3

CRN 107-13-1
CMF C3 H3 N

$H_2C{=}CH{-}C{\equiv}N$

CM 4

CRN 97-90-5
CMF C10 H14 O4




CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76
ST battery electrolyte **microporous** composite polymer
IT Battery electrolytes
Electric impedance
Ionic conductivity
Polymer electrolytes
Transference number
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT Polyoxyalkylenes, preparation
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)

IT Fluoropolymers, uses
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT Secondary batteries
(lithium; ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT Polymerization
(microemulsion; ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT Emulsions
(microemulsions; ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT 96-48-0, γ-Butyrolactone 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 7439-93-2, Lithium, uses 12057-17-9, Lithium manganese oxide limn2o4
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT 7439-93-2D, Lithium, polyoxyalkylene-acrylate complexes, uses 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 33454-82-9, Lithium trifluoromethanesulfonate **237770-04-6D**, polyoxyalkylene-acrylate complexes
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT 107-13-1, Acrylonitrile, reactions
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)
IT 24937-79-9, Pvdf
(ionic cond. and electrochem. characterization of novel **microporous** composite polymer electrolytes)

L91 ANSWER 7 OF 14 HCA COPYRIGHT 2007 ACS on STN
131:164663 Novel polymer-modified **electrodes** for batch injection sensors and application to environmental analysis. Brett, Christopher M. A.; Fungaro, Denise A.; Morgado, Jose M.; Gil, M. Helena (Departamento de Quimica, Universidade de Coimbra, Coimbra, 3049, Port.). Journal of Electroanalytical Chemistry, 468(1), 26-33 (English) **1999**. CODEN: JECHES. Publisher: Elsevier Science S.A..
AB Various polymer coatings were studied for the protection of mercury thin-film **electrodes** in the square wave **anodic** stripping voltammetry of environmental samples using batch injection anal., with injection of untreated samples of vol. 50 µL directly over the sensing **electrode**. Polymer coatings studied include those with controlled **porosity**, and cation-exchange polymers based on sulfonated polymers. Of the polymers tested, films of .apprx.1 µm thickness made from **Nafion**.RTM. mixed with 5% poly(vinyl sulfonic acid) gave the

best results in tests with the model surfactants Triton-X-100 detergent, sodium dodecyl sulfate and protein std. The validity of the approach is demonstrated by application to real samples.

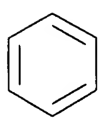
IT **50851-57-5**, Polystyrene sulfonic acid
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 38, 61, 72

ST environmental analysis batch injection sensor polymer modified **electrode**

IT Polyoxyalkylenes, analysis
(fluorine- and sulfo-contg., ionomers, **Nafion**; metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT Polyoxyalkylenes, analysis
(fluorine-contg., sulfo-contg., ionomers, **Nafion**; metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT **Anodic** stripping voltammetry
Environmental analysis
Film **electrodes**
Flow injection analysis
River waters

Wastewater
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT Metals, analysis
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT Fluoropolymers, analysis
Fluoropolymers, analysis
(polyoxyalkylene-, sulfo-contg., ionomers, **Nafion**; metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg., **Nafion**; metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT 7732-18-5, Water, analysis
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT 7439-92-1, Lead, analysis 7440-43-9, Cadmium, analysis 7440-50-8, Copper, analysis 7440-66-6, Zinc, analysis
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

IT 9004-38-0, Cellulose acetate hydrogen phthalate 26101-52-0, Polyvinyl sulfonic acid 26355-01-1, Poly(methyl methacrylate-2-hydroxyethyl methacrylate) **50851-57-5**, Polystyrene sulfonic acid 58778-89-5, Maleic anhydride-vinyl sulfonic acid copolymer 86594-04-9, Styrene-vinyl sulfonic acid copolymer
(metal cations detn. in environmental samples by batch injection anal. using square wave **anodic** stripping voltammetry detection at polymer modified Hg film **electrodes**)

L91 ANSWER 8 OF 14 HCA COPYRIGHT 2007 ACS on STN
131:104489 Electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen reduction, hydrogen oxidation, and methanol oxidation. Lefebvre, Mark C.; Qi, Zhigang; Pickup, Peter G. (Department of Chemistry, Memorial University of Newfoundland, St. John's, NF, A1B 3X7, Can.). Journal of the Electrochemical Society, 146(6), 2054-2058 (English) **1999**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB A variety of supported catalysts were prepd. by the chem. deposition

of Pt and Pt-Ru particles on chem. prepd. poly(3,4-ethylenedioxythiophene)/poly(styrene-4-sulfonate) (PEDOT/PSS) and PEDOT/polyvinylsulfate (PVS) composites. The polymer particles were designed to provide a **porous**, proton-conducting and electron-conducting catalyst support for use in fuel cells. These polymer-supported catalysts were characterized by electron microscopy, impedance spectroscopy, cyclic voltammetry, and cond. measurements. Their catalytic activities toward hydrogen and methanol oxidn. and oxygen redn. were evaluated in proton exchange **membrane** fuel-cell-type gas diffusion **electrodes**. Activities for oxygen redn. comparable to that obtained with a com. carbon-supported catalyst were obsd., whereas those for hydrogen and methanol oxidn. were significantly inferior, although still high for prototype catalysts.

IT **28210-41-5**, Poly(styrene-4-sulfonic acid)
(electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

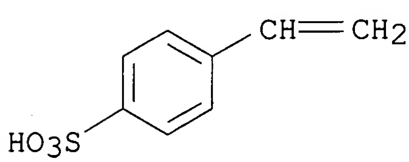
RN 28210-41-5 HCA

CN Benzenesulfonic acid, 4-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 98-70-4

CMF C8 H8 O3 S




CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT Oxidation catalysts
Reduction catalysts
(electrochem.; electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT Conducting polymers
Fuel cells
Oxidation, electrochemical
Reduction, electrochemical
(electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells

electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT Polyoxyalkylenes, uses
(fluorine-contg., sulfo-contg., ionomers; electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT Fluoropolymers, uses
Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
(electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT 25191-25-7, Polyvinylsulfate **28210-41-5**, Poly(styrene-4-sulfonic acid) 66796-30-3, **Nafion** 117 126213-51-2, Poly(3,4-ethylenedioxythiophene)
(electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

IT 67-56-1, Methanol, reactions 1333-74-0, Hydrogen, reactions 7782-44-7, Oxygen, reactions
(electronically conducting proton exchange polymers as catalyst supports for proton exchange **membrane** fuel cells electrocatalysis of oxygen redn., hydrogen oxidn., and methanol oxidn.)

→L91 ANSWER 9 OF 14 HCA COPYRIGHT 2007 ACS on STN
130:155988 Electron and proton transport in gas diffusion **electrodes** containing electronically conductive proton-exchange polymers. Qi, Zhigang; Lefebvre, Mark C.; Pickup, Peter G. (Department of Chemistry, Memorial University of Newfoundland, St. John's, NF, A1B 3X7, Can.). Journal of

Electroanalytical Chemistry, 459(1), 9-14 (English) **1998**.
CODEN: JECHES. Publisher: Elsevier Science S.A..

AB A novel supported catalyst has been prepd. by the chem. deposition of Pt particles on a polypyrrole|polystyrenesulfonate (PPY|PSS) composite. The chem. prepd. polymer particles were designed to provide a **porous**, proton and electron conducting catalyst support for use in fuel cells. Transmission electron microscopy, cond. measurements, impedance spectroscopy, and cyclic voltammetry confirm that these properties have been achieved. The chem. prepd. PPY|PSS composite exhibits very high proton conductivities that are several orders of magnitude higher than for electrochem. prepd. films. Currents of 0.1 A cm-2 have been obsd. for oxygen redn. in proton exchange **membrane** fuel cell type gas diffusion **electrodes**.

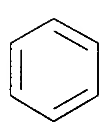
IT **50851-57-5**
(electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH═CH2

D1—SO3H

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST polypyrrole polystyrenesulfonate composite gas diffusion **electrode**; fuel cell **electrode** polypyrrole polystyrenesulfonate composite

IT Catalysts
(electrocatalysts; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive

proton-exchange polymers)
IT Conducting polymers
Fuel cell **cathodes**
(electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT Polyoxyalkylenes, uses
(fluorine-contg., sulfo-contg., ionomers; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT Fuel cell **electrodes**
Fuel cell **electrodes**
(gas diffusion; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT **Electrodes**
(gas-diffusion; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT Fluoropolymers, uses
Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT 7440-06-4, Platinum, uses
(electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT 30604-81-0, Polypyrrole **50851-57-5** 66796-30-3, **Nafion** 117
(electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)
IT 7782-44-7, Oxygen, reactions
(electron and proton transport in gas diffusion **electrodes** contg. electronically conductive proton-exchange polymers)

L91 ANSWER 10 OF 14 HCA COPYRIGHT 2007 ACS on STN
125:20987 Electrochemistry at Ultrathin Organic Films at Planar Gold

**Electrodes**. Lindholm-Sethson, Britta (Department of Analytical Chemistry, Ume University, Ume, S-901 87, Swed.). Langmuir, 12(13), 3305-3314 (English) **1996**. CODEN: LANGD5. ISSN: 0743-7463. Publisher: American Chemical Society.

AB Electrochem. impedance measurements were performed on two different mol. assemblies that were created to mimic living cell **membranes**. In the 1st, a bare gold **electrode** surface was used as a support for Langmuir-Blodgett transfers of mono-, bi-, and multilayers of dipalmitoylphosphatidic acid. In the 2nd, a thin polyelectrolyte film was self-assembled on the gold surface prior to the Langmuir-Blodgett transfer. A small **membrane** resistivity, i.e. 100-300 Ω cm2, was obsd. across the phospholipid bilayer when deposited on the polyelectrolyte surface provided the outermost layer was polyanionic. The contribution to the total **membrane** capacitance from one monolayer in these assemblies was 1.16 μF cm-2. Similar results for the **membrane** capacitance were obtained in multilayer assemblies of more than five monolayers when the support was a bare gold **electrode** surface, whereas thinner multilayer assemblies displayed significantly higher capacitances. Also, the main contribution to the **membrane** resistance in the latter case was shown to originate from resistances in defect **pores**, through which the double-layer capacitances at the ends and inside these defects were charged.

IT **9080-79-9**, Sodium poly(styrenesulfonate)
(gold **electrode** modified with sodium poly(styrenesulfonate) and polyallylamine hydrochloride)

RN 9080-79-9 HCA

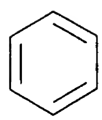
CN Benzenesulfonic acid, ethenyl-, homopolymer, sodium salt (9CI) (CA INDEX NAME)

CM 1

CRN 50851-57-5
CMF (C8 H8 O3 S)x
CCI PMS

CM 2

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



$D1-CH=CH_2$

$D1-SO_3H$

CC 72-2 (Electrochemistry)
Section cross-reference(s): 6, 66, 76
ST ultrathin org film planar gold **electrode**; electrochem ultrathin org film gold **electrode**; dipalmitoylphosphatidic acid gold **electrode**; mol assembly mimic living cell **membrane**; impedance mol assembly
IT Phospholipids, uses
(gold **electrodes** modified with)
IT Polyelectrolytes
(gold **electrodes** modified with dipalmitoylphosphatidic acid and)
IT **Membrane**, biological
(impedance of two different mol. assemblies mimicing)
IT Electric impedance
(of gold **electrode** modified with dipalmitoylphosphatidic acid and polyelectrolytes in calcium nitrate soln.)
IT Adsorbed substances
(polyelectrolyte on gold **electrode**)
IT **Electrodes**
(ultrathin org. films at planar gold **electrodes**)
IT Electric circuits
(equiv., for supported lipid **membrane** located on **electrode** covered with polyelectrolyte)
IT 10124-37-5, Calcium nitrate
(elec. impedance of gold **electrode** modified with dipalmitoylphosphatidic acid and polyelectrolytes in soln. of)
IT 7440-57-5, Gold, uses
(electrochem. at ultrathin org. films at planar gold **electrodes**)
IT **9080-79-9**, Sodium poly(styrenesulfonate) 71550-12-4, Polyallylamine hydrochloride
(gold **electrode** modified with sodium poly(styrenesulfonate) and polyallylamine hydrochloride)

IT 19698-29-4, Dipalmitoylphosphatidic acid
(gold **electrodes** modified with)

L91 ANSWER 11 OF 14 HCA COPYRIGHT 2007 ACS on STN
124:69665 Impedance measurements of ionic conductivity as a probe of structure in electrochemically deposited polypyrrole films. Ren, Xiaoming; Pickup, Peter G. (Department of Chemistry, Memorial University of Newfoundland, St. John's, Newfoundland, A1B 3X7, Can.). Journal of Electroanalytical Chemistry, 396(1-2), 359-64 (English) **1995**. CODEN: JECHES. Publisher: Elsevier.

AB Ionic conductivities detd. from impedance measurements on electrochem. deposited films of polypyrrole and a polypyrrole+polystyrene sulfonate composite were used to distinguish between several morphol. models of these materials. Both materials show ionic conductivities that depend strongly on potential and electrolyte concn., thus discounting **porous** metal and homogeneous perm-selective polymer models. The ionic conductivities are strongly affected by changing the counterion, but the co-ion has little influence. These materials consist of perm-selective polymer aggregates which enclose **pores** contg. electrolyte soln. Such materials appear to work well as perm-selective **membranes** because of the poor interconnectivity between **pores**.

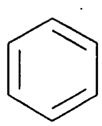
IT **50851-57-5**
(impedance measurements of ionic cond. as probe of structure in electrochem. deposited perchlorate-doped polypyrrole and polypyrrole-polystyrene sulfonate films)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1— CH═CH2

D1— SO3H

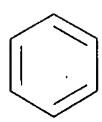
IT **9080-79-9**, Sodium polystyrene sulfonate
(impedance measurements of ionic cond. as probe of structure in electrochem. deposited perchlorate-doped polypyrrole and polypyrrole-polystyrene sulfonate films in electrolyte contg.)
RN 9080-79-9 HCA
CN Benzenesulfonic acid, ethenyl-, homopolymer, sodium salt (9CI) (CA INDEX NAME)

CM 1

CRN 50851-57-5
CMF (C8 H8 O3 S)x
CCI PMS

CM 2

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1— CH═CH2

D1— SO3H

CC 72-2 (Electrochemistry)
Section cross-reference(s): 36, 76
IT **50851-57-5**
(impedance measurements of ionic cond. as probe of structure in electrochem. deposited perchlorate-doped polypyrrole and polypyrrole-polystyrene sulfonate films)
IT 7601-89-0, Sodium perchlorate 7647-01-0, Hydrochloric acid, uses 7647-14-5, Sodium chloride, uses **9080-79-9**, Sodium polystyrene sulfonate
(impedance measurements of ionic cond. as probe of structure in electrochem. deposited perchlorate-doped polypyrrole and polypyrrole-polystyrene sulfonate films in electrolyte contg.)
IT 7440-06-4, Platinum, uses
(impedance measurements of ionic cond. as probe of structure in

electrochem. deposited perchlorate-doped polypyrrole and polypyrrole-polystyrene sulfonate films on platinum **electrode**)

L91 ANSWER 12 OF 14 HCA COPYRIGHT 2007 ACS on STN
112:115365 An electroanalytical method. Uchiyama, Shunichi; Suzuki, Shuichi (Mitsui Engineering and Shipbuilding Co., Ltd., Japan). Eur. Pat. Appl. EP 326421 A2 **19890802**, 9 pp. DESIGNATED STATES: R: CH, DE, FR, GB, LI. (English). CODEN: EPXXDW. APPLICATION: EP 1989-300834 19890127. PRIORITY: JP 1988-18696 19880129.

AB An electroanal. method which can detect and det. a substance in a short time, with stability and simplicity is provided. The method comprises providing an electrolytic cell having a working **electrode** chamber and a counter **electrode** chamber sepd. by the medium of a separator; electrolyzing a sample to be detd., by feeding it to a working **electrode** contained in the working **electrode** chamber and consisting of an electroconductive **porous** body impregnated with an electrolyte in a nonflowing state; and measuring ≥1 of the elec. voltage, elec. current, and elec. quantity in the working **electrode**, to det. the substance in the sample. The concn. of reduced L-ascorbic acid in various foods (lemon soft drink, grapefruit juice, orange, tomato) was measured by controlled potential coulometry using ferricyanide ion as the oxidn. mediator, a working **electrode** of carbon felt made from polyacrylonitrile fibers impregnated with H3PO4-Na phosphate buffer (pH 4) contg. satd. K3Fe(CN)6, a counter **electrode**, and a separator cation-exchange **membrane** (Naphion 117). Anal. results were favorably compared with the indophenol method and HPLC.

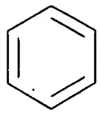
IT **50851-57-5**, Polystyrenesulfonic acid
(**membrane**, in electrolytic cell)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

IC ICM G01N027-46
CC 9-7 (Biochemical Methods)
Section cross-reference(s): 17, 79, 80
IT Sulfonic acids, uses and miscellaneous
(**membrane**, in electrolytic cell)
IT Electrolytic cells
(nonflowing electrolyte-impregnated electroconductive **porous** body **electrodes** in)
IT **Electrodes**
(of electroconductive **porous** body impregnated with nonflowing electrolyte)
IT Cation exchangers
(**membranes**, in electrolytic cell)
IT 9003-99-0, Peroxidase 9028-76-6, Cholesterol oxidase
(**electrodes** impregnated with, in electrolytic cell for blood cholesterol detn.)
IT 9029-44-1, Ascorbic acid oxidase
(**electrodes** impregnated with, in electrolytic cell for vitamin C detn.)
IT **50851-57-5**, Polystyrenesulfonic acid
(**membrane**, in electrolytic cell)

L91 ANSWER 13 OF 14 HCA COPYRIGHT 2007 ACS on STN
109:213627 Ionomeric polymers with ionomer **membrane** in pressure-tolerant gas-diffusion **electrodes**. Gordon, Arnold Z.; Yeager, Ernest B.; Tryk, Donald S.; Hossain, M. Sohrab (Gould, Inc., USA). PCT Int. Appl. WO 8806642 A1 **19880907**, 28 pp. DESIGNATED STATES: W: JP, US; RW: DE, FR, GB. (English). CODEN: PIXXD2. APPLICATION: WO 1988-US621 19880302. PRIORITY: US 1987-20748 19870302.
AB A gas-diffusion **electrode** for a gas-generating or -consuming electrochem. cell using a liq. electrolyte comprises an electronically conductive and electrochem. active **porous** body defining resp. gas- and electrolyte-contacting surfaces, and an

ionomeric ionically conductive gas-impermeable layer covering substantially the entire electrolyte-contacting surface. The layer comprises a layer of a hydrophilic ionic polymer applied as a liq. soln. directly to the entire electrolyte-contacting surface and a **membrane** of a hydrophilic ion-exchange resin directly overlying the polymer layer. The resin comprises a quaternized ammonium polymer, a tetralkylammonium polymer, or a polymer backbone (fluorinated polymer, PTFE) grafted with quaternized vinylbenzene amine. The ionic polymer is a cationic or anionic polymer, e.g. poly(diallyldimethylammonium chloride) or poly(styrenesulfonic acid), and the **membrane** is an anion exchange resin (perfluorosulfonic acid polymer) or a cation exchange resin, resp. The **porous** body is a laminate of a **porous** hydrophobic layer defining the gas-contacting surface, and a **porous** active layer defining the electrolyte-contacting surface, the active layer comprising C and Co tetra(p-methoxyphenyl)porphyrin. A series of O redn. polarization curves for the invention **electrodes** is given. Very great increases in c.d. were available with only minor increases in the potential driving force over a wide range of c.ds.

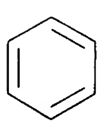
IT **50851-57-5**, Poly(styrenesulfonic acid)
(**electrodes** contg. layer of, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin catalytic)

RN 50851-57-5 HCA

CN Benzenesulfonic acid, ethenyl-, homopolymer (CA INDEX NAME)

CM 1

CRN 26914-43-2
CMF C8 H8 O3 S
CCI IDS



D1—CH=CH2

D1—SO3H

IC ICM C25B007-00
ICS C25B009-00; C25B011-00; C25B011-03; C25B011-12; C25B013-00; H01M004-86; H01M004-90; H01M004-96

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

ST **electrode** gas diffusion; polydiallyldimethylammonium chloride gas diffusion **electrode**; polystyrenesulfonic acid gas diffusion **electrode**; perfluorosullfonic acid polymer **electrode**; ammonium quaternized polymer **electrode**; tetraalkylammonium polymer gas diffusion **electrode**; vinylbenzene amine quaternized PTFE **electrode**; cobalt methoxyphenylporphyrin oxygen **electrode**; porphyrin tetramethoxyphenyl cobalt oxygen **electrode**; oxygen cobalt tetramethoxyphenylporphyrin **electrode**

IT Quaternary ammonium compounds, polymers
(**electrodes** contg. layer of, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin catalytic)

IT **Electrodes**
(electrolytic-cell, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin with layers of poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer)

IT Reduction, electrochemical
(of oxygen, cobalt tetra(p-methoxyphenyl)porphyrin-catalytic **electrodes** with poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer)

IT Fluoropolymers
(quaternary ammonium polymer-grafted, **electrodes** contg. layer of, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin catalytic)

IT **Cathodes**
(battery, catalytic, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin with layers of poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer)

IT **Cathodes**
(fuel-cell, catalytic, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin with layers of poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer)

IT Sulfonic acids, polymers
(polymers, perfluoro, **electrodes** contg. layer of, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin catalytic)

IT 9002-84-0D, PTFE, quaternary ammonium polymer-grafted 26062-79-3, Poly(diallyldimethylammonium chloride) **50851-57-5**, Poly(styrenesulfonic acid)
(**electrodes** contg. layer of, oxygen-cobalt tetra(p-methoxyphenyl)porphyrin catalytic)

IT 28903-71-1, Cobalt tetra(p-methoxyphenyl)porphyrin
(**electrodes**, oxygen-catalytic, with layers of poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer)

IT 7782-44-7, Oxygen, reactions
(redn. of, cobalt tetra(p-methoxyphenyl)porphyrin-catalytic **electrodes** with layers of poly(diallyldimethylammonium chloride) and perfluorosulfonic acid polymer for)

L91 ANSWER 14 OF 14 HCA COPYRIGHT 2007 ACS on STN
86:113013 Ion-selective permeable **membrane** for electrolysis of concentrated solution at high temperature. Kojima, Katsuyoshi; Hiramatsu, Teruo (Japan). Jpn. Kokai Tokkyo Koho JP 51135890 **19761125** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1975-59294 19750520.

AB Powd. polyethylene (I) of mean mol. wt. >3 + 105 is blended with a 1-2-fold amt. of powd. ion-exchange resin (IER) of fairly high bridging near the m.p. of I at >300 kg/cm2 pressure and >250 kg/cm2 shearing stress for 1-2 min, formed to a block, and cut to a desired thickness, if necessary, formed further by pressing and heating. Thus, when with I of (5-10) + 105 mean mol. wt. and melt index <0.01 and IER of styrene-divinylbenzenesulfonic acid of 15-20% bridging were mixed in a 1:(1.8-2.5) ratio, and a laminated film of 0.15-0.35 mm thick, **pore** diam. 10-8-10-6 cm, and **porosity** 30-45% and of 1-3, 10-4-10-2, and 60-85%, resp., was contacted to stainless steel net **cathode**, satd. NaCl soln. in the **anode** chamber was electrolyzed at 70-95° and 10 A/dm2, and NaOH > 50% contg. NaCl <0.01% was obtained for >500 h in the **cathode** chamber. The films allowed Na+ only to permeate. The desired **porosity** was obtained by using I and IER of an appropriate size (<80 and 100 mesh), optionally with salt such as NaCl, and the forming was carried out at 150° and 80 kg/cm2. With similar cation- and anion-exchange films, Al can be removed from H2SO4 contg. it.

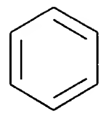
IT **62196-93-4**
(diaphragms, for electrolysis of brines)

RN 62196-93-4 HCA

CN Benzenesulfonic acid, diethenyl-, polymer with ethene and ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 53232-34-1
CMF C10 H10 O3 S
CCI IDS



2 [ D1—CH=CH$_2$ ]

D1—$SO_3H$

CM 2

CRN 100-42-5
CMF C8 H8

$H_2C$=CH—Ph

CM 3

CRN 74-85-1
CMF C2 H4

$H_2C$=$CH_2$

IC C08J005-22
CC 72-10 (Electrochemistry)
IT **62196-93-4**
(diaphragms, for electrolysis of brines)